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Curcuma nivea (Zingiberaceae), a New Compact Species with Horticultural Potential from Eastern Thailand

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Abstract

The genus *Curcuma* (Zingiberaceae) is a diverse group of plants widely distributed across tropical Asia, with several new species recently described in Thailand. This study documents and clarifies the taxonomic status of a new species, *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov., discovered in eastern Thailand, and evaluates its horticultural potential. Morphological comparisons were conducted with closely related species in the *Curcuma* subgenus *Hitcheniopsis* (Baker) K. Schum., focusing on diagnostic vegetative and floral traits. *Curcuma nivea* is characterized by its compact habit and white flowers marked with two reddish lines at the base of the labellum, lacking the yellow blotch typical of related species. Additionally, it shows the absence of both epigynous glands and anther spurs, consistent with subgeneric features. Its distinctive morphology and attractive floral display have led to its cultivation as an ornamental pot plant. The discovery of *C. nivea* contributes to the growing documentation of *Curcuma* diversity in Thailand and underscores the significance of ongoing botanical exploration and conservation. Furthermore, its compact form and unique floral traits highlight its promise for use in ornamental horticulture and breeding programs.

Keywords: compact growth; *Curcuma*; ginger; *Hitcheniopsis*; new species; *Stahlianthus*; taxonomy; Thailand; Zingiberaceae

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1. Introduction

The family Zingiberaceae, with its rich diversity and ecological significance, represents one of the important plant families in tropical Asia [1–5]. Comprising over 1600 species across 58 genera [6,7], Zingiberaceae species are widely known for their horticultural, medicinal, and culinary value [4,5,8,9]. In Thailand, this family is well-represented, with numerous species playing vital roles in traditional medicine and cuisine and being used as ornamental plants [1,2,8,10]. The genus *Curcuma* L., a prominent member of this family, holds significant ecological and economic importance, contributing both to local biodiversity and the global ornamental plant trade [1,2,8,11].

Curcuma currently encompasses 176 accepted species globally, with 88 accepted species in Thailand [6]. These species are distributed throughout tropical and subtropical regions of

Asia, with a high concentration of endemism in Southeast Asia [2,6]. Many species within the genus are known for their showy, often brightly colored flowers and bracts, which make them highly sought after for ornamental purposes [8,12,13]. Moreover, *Curcuma* species are of considerable ethnobotanical importance, with applications in Thai cuisine, medicine, and traditional rituals [1,2,13].

Taxonomically, *Curcuma* is a complex genus, with many species historically classified under different genera based on morphological traits [14–16]. One such genus, *Stahlianthus* Kuntze, was once considered a distinct entity within Zingiberaceae [16], primarily due to its distinct campanulate inflorescences and morphological differences in the labellum. *Stahlianthus* species typically have a labellum with a prominent yellow blotch in the midlobe, a feature that distinguished them from other *Curcuma* species [14,17–19]. However, recent molecular phylogenetic studies have demonstrated that *Stahlianthus* is not a distinct lineage but rather a member of *Curcuma*, specifically within the subgenus *Hitcheniopsis* (Baker) K.Schum. [20]. This reclassification has reshaped our understanding of *Curcuma* and its subgenera [20,21], revealing that the morphological characters once considered diagnostic of *Stahlianthus* are in fact variations within *Curcuma* [20].

Species in the subgenus *Hitcheniopsis* are characterized by the absence of epigynous glands and anther spurs [21], traits that distinguish them from other *Curcuma* subgenera. The inflorescences of *Hitcheniopsis* species are typically enclosed within leaf sheaths, a feature that is more pronounced in some species, while others exhibit more open inflorescences. These species have long been admired for their ornamental value, particularly due to their compact size, attractive bracts, and striking floral displays [1,2]. To date, Thailand is home to several species within this subgenus, with new species discoveries occurring regularly [22].

In recent years, an undescribed species of *Curcuma* has been identified from eastern Thailand, adding to the growing diversity of the genus in the region. It bears a labellum that is entirely white with two reddish lines tinged at the base and lacks the dominant yellow blotch that is typically observed in allied species. The rhizomes of this species are pale pinkish cream internally, further distinguishing it from others within the subgenus. In addition to these morphological differences, the species is characterized by its compact size, making it an ideal candidate for cultivation as an ornamental potted plant.

Since its discovery in 2024, this species has gained popularity in the ornamental plant market due to its striking white flowers and compact growth habit. Unlike many other species in the former *Stahlianthus* group, which often have larger inflorescences and more pronounced yellow markings, this species' subtle beauty and manageable size have made it a favorite among plant collectors and horticulturists. As an ornamental plant, it offers both aesthetic appeal and practical advantages for cultivation in smaller spaces, such as home gardens and indoor pots.

This study provides a detailed morphological description of the newly identified species and places it within the broader context of *Curcuma* taxonomy. Through careful comparative analysis with other species in the subgenus *Hitcheniopsis* [21], especially former *Stahlianthus* species [14,23], we confirm that this species represents a distinct taxon within this genus. The discovery of this species not only enhances our understanding of *Curcuma* diversity in Thailand but also highlights its horticultural potential as a new ornamental species. As the demand for compact and unique ornamental pot plants grows, it presents an exciting addition to the global ornamental plant market.

2. Materials and Methods

This study was based on field surveys conducted during botanical collection missions in Sirindhorn District, Ubon Ratchathani Province, Eastern Thailand (Figure 1), from 2024

to 2025. Specimens of *Curcuma* were collected from their natural habitats, and both living and preserved materials were examined. Morphological measurements were conducted on fresh and alcohol-preserved specimens using a standard ruler and a vernier caliper (Mitutoyo Vernier Caliper; Mitutoyo Corporation, Kawasaki, Japan). Micromorphological features were observed using a stereoscopic microscope (Stemi 2000-C; Zeiss, Oberkochen, Germany). Dried specimens were prepared by pressing and drying using a laboratory oven (Drying and Heating Oven, built 2018, safety device DIN 12880, Class 2.0, Art. No. 9010-0293, Binder GmbH, Tuttlingen, Germany; Serial No. 20180000020017) at 60 °C. Spirit specimens were preserved in 70% ethanol. Type specimens, along with additional preserved and dried specimens, were deposited at the Vascular Plant Herbarium, Mahasarakham University (VMSU), Thailand.

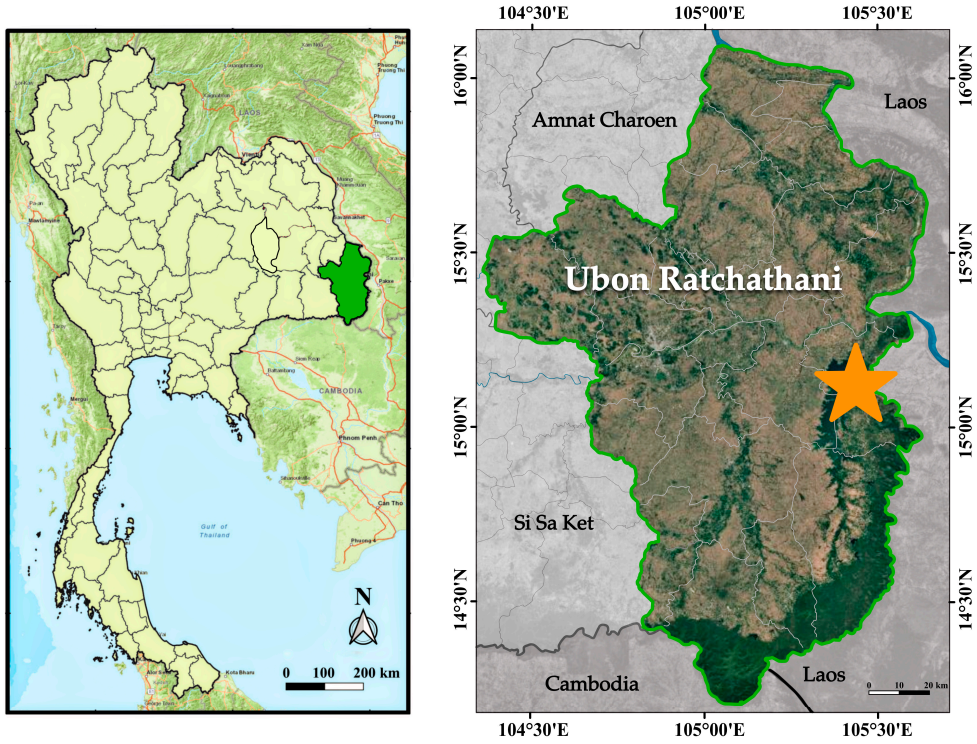

Figure 1. Map of the type locality of *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov.: Left—Map of Thailand showing Ubon Ratchathani Province (green); Right—Map of Ubon Ratchathani Province showing the type locality (yellow star) of *C. nivea* in Sirindhorn District. Graphics designed using the Pixelmator Pro Program (Version 3.6.15 (Archipelago)), 2025, Pixelmator Team, Vilnius, Lithuania, designed by Thawatphong Boonma.

Species identification was performed by comparing diagnostic morphological characters against descriptions and identification keys provided in the *Flora of Thailand* Volume 16 part two and other regional floras [23,24]. Detailed comparisons were made with protologues and type specimens of morphologically similar species. High-resolution images of type specimens were consulted through major herbaria including A, AAU, B, BK, BKF, C, CAL, CMU, E, HITBC, K, KKU, KUN, L, M, MO, P, PE, QBG, SING, and VNM, including via JSTOR Global Plants (https://plants.jstor.org, accessed on 31 May 2025) and the Global Biodiversity Information Facility (GBIF) [25].

To avoid duplication of the species epithet, nomenclatural verification was conducted by consulting Plants of the World Online [6] and the International Plant Name Index [26]. Additional taxonomic context was established by reviewing published literature and diagnostic characters of species within *Curcuma*, especially those belonging to *Curcuma* subgenus *Hitcheniopsis* [14,17,18].

Regarding horticultural potential and ethnobotanical use, informal interviews were conducted with local sellers and cultivators in the area. While no personal data were collected, interviews focused on vernacular names, plant parts used, and purposes of use. Economic value was assessed through observations and reports from three sellers, documenting the selling price per plant or per pot (excluding shipping costs) [8]. Cultivation guidelines were inferred from ecological characteristics observed in the species' natural habitat. All graphics and illustrations in this study were created using the Pixelmator Pro Program (Version 3.6.5 (Archipelago), 2023, Pixelmator Team, Vilnius, Lithuania) on a MacBook Pro (13-inch, M1, 2020, Apple Inc., Cupertino, CA, USA). Line drawings were executed on an iPad Air 5 (iPadOS 17.5.1 (21F90), 2024, Apple Inc., Cupertino, CA, USA).

Methods for assessing economic values (Gross Annual Revenue) use the same method of Saensouk et al. [8]. To calculate the gross annual revenue from individual plants, the following formula was applied:

$$\text{Gross Annual Revenue (GARp)} = \text{Np} \times \text{Nm} \times \text{Pp} \quad (1)$$

where Np = number of plants sold per month; Nm = number of months in the sales period per year; and Pp = price per plant. This formula was applied separately for the lower and higher price points to determine the range of potential gross annual revenue. This formula was also applied separately for the lower and higher price points to determine the range of potential gross annual revenue [8].

3. Results

3.1. Taxonomic Treatments Curcuma nivea Saensouk, P.Saensouk & Boonma sp. nov.

Diagnosis: The new species is similar to *Curcuma pedicellata* (Chaveer. & Mokkamul) Škorničk. but differs in having shorter leafy shoots (10–15 cm vs. 15–30 cm tall), pubescent leaf sheaths and petioles (vs. glabrous), smaller pubescent leaves with a green midrib (vs. larger, glabrous leaves with a red midrib), a longer pubescent peduncle (5.5–12.7 cm vs. 3–6 cm, glabrous), pubescent bracts and bracteoles (vs. glabrous), sessile flowers (vs. pedicel c. 0.3 cm), pubescent calyx, floral tube, and dorsal corolla lobe (vs. glabrous), lateral staminodes pure white and pubescent on both sides (vs. white with yellow at base, pubescent only on inner side), and a white labellum with two pale reddish lines at the base (vs. midlobe yellow and red blotch). The filament, anther, and anther crest are all pubescent (vs. glabrous), and the stigma is ciliate (vs. glabrous). The fruits are pale green (vs. white).

Type: Thailand, Eastern, Ubon Ratchathani Province, Sirindhorn District, Altitude c. 143 m a.s.l., 22 April 2025, *Saensouk and Boonma 25422* (holotype VMSU! [VMSU00000003], isotype KKU!).

Description: Perennial herb, rhizomes ovoid, erect, stout, pale pinkish cream internally, roots fibrous, some expanded into globose to subglobose tubers at the apex. Leafy shoot 10–15 cm tall. Sheaths 2–4, 2.5–8.5 × 1.0–1.2 cm, green with red stripes along the veins, apex acute, pubescent. Petioles 2.0–4.8 cm long, green, slightly canaliculate, pubescent. Ligules very short, 0.05–0.1 cm long, bilobed, each lobe rounded, ciliate. Leaves linear to narrowly oblanceolate, 5.5–11.0 × 0.4–1.0 cm, base narrowly cuneate, apex acute, pubescent, adaxial surface green with green midrib, pubescent, abaxial surface pale green, pubescent, margin entire, with semi-translucent pale green hyaline. Inflorescences produced from rhizome, erect, 6.0–14.0 cm tall above ground, peduncle 5.5–12.7 cm long, cylindrical, slightly larger diameter at the distal part connecting to the campanulate bracts. Bracts campanulate, 3.0–4.5 cm long, and 1.3–1.7 cm in diameter at the broadest point that forms a pouch, with apex bilobed, each lobe with acute tip, reflexed, dark red with green at distal part, pubescent. Bracteoles linear–triangular, 0.6–0.7 × 0.1 cm, membranous, apex acute,

glabrous except a few short hairs at the tip. Flowers 10–24, white, pedicel sessile. Calyx tube 0.9–1.0 × 0.3 cm, membranous, whitish, apex trilobed, each lobe rounded, sparse hairs with a few short hairs at the tip. Floral tube tubular, 1.8–2.5 × 0.14–0.18 cm, white, glabrous; dorsal corolla lobe ovate–oblong, 1.0–1.1 × 0.5 cm, boat-shape, apex slightly hooded with mucronate ca. 0.1 cm long, white, glabrous except for a few hairs at the tip; lateral corolla lobes ovate–oblong, c. 1.0 × 0.4 cm, apex obtuse to rounded, white, glabrous. Lateral staminodes narrowly obovate, 1.2–1.3 × 0.3–0.6 cm, white, pubescent. Labellum spatulate, 1.7–1.8 × 1.3–1.5 cm, base claw 0.7 × 0.5 cm, white with two pale reddish lines at base, bilobed, each lobe apex rounded, sinus 5–7 mm long, pubescent. Stamen 1; filament very short c. 0.05 cm long, c. 0.14 cm broad, flattened, white, pubescent. Anther c. 0.5 × 0.2 cm, white, pubescent; anther crest obovate–oblong, 0.3–0.4 × 0.2–0.3 cm, apex rounded, rarely retuse, white, pubescent. Stigma cup-shaped, with median dorsal lobe extending into an acute apex, white, ciliate. Ovary ellipsoid, c. 0.2 × 0.15 cm whitish, glabrous. Fruit ellipsoid, 0.5–0.7 × 0.3–0.35 cm, triangular, pale green, glabrous, trilocular, placentation exile, pedicel sessile. Seeds many, ovoid–oblong, 0.25 × 0.1 cm, brown (Figures 2–4).



Figure 2. *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov.: (**a**) Side view of flower; (**b**) Habit showing the dissection of internal rhizome; (**c**) Dorsal corolla lobe; (**d**) Lateral corolla lobes; (**e**) Staminodes; (**f**) Labellum; (**g**) Bracteole; (**h**) Front view of anther; (**i**) Side view of anther with filament, floral tube, calyx and ovary; (**j**) Fruit with calyx; (**k**) Habit with the dissection of campanulate bracts, showing cincinni; (**l**) Dissection of campanulate bracts. Photographs and design by T.B.

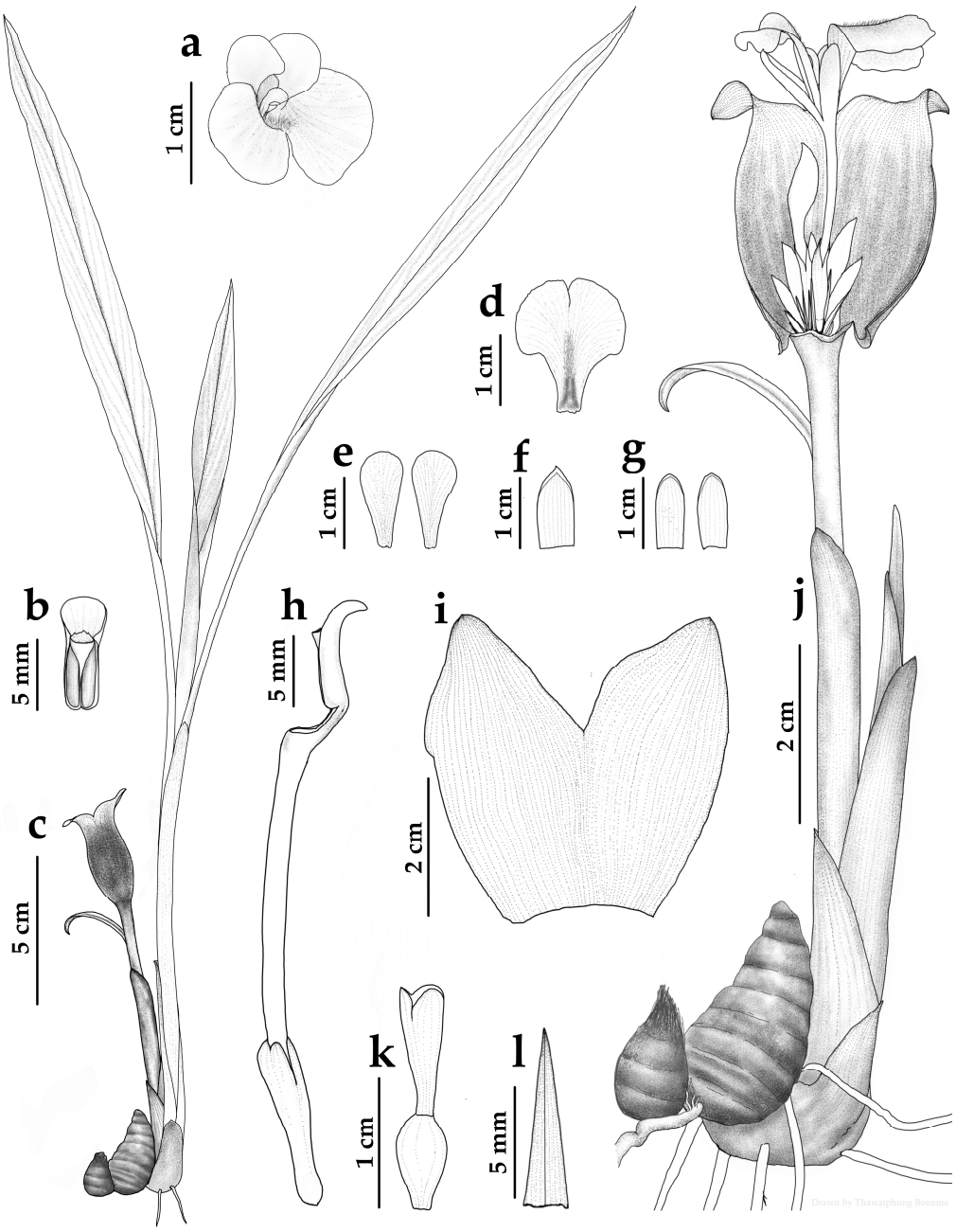

Figure 3. *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov.: (**a**) Semi-top view of flower; (**b**) Front view of anther; (**c**) Habit showing a pseudostem during the post-flowering stage; (**d**) Labellum; (**e**) Staminodes; (**f**) Dorsal corolla lobe; (**g**) Lateral corolla lobes; (**h**) Side view of anther with filament, floral tube, calyx and ovary; (**i**) Dissection of campanulate bracts; (**j**) Habit with the dissection of campanulate bracts, showing cincinni; (**k**) Fruit with calyx; (**l**) Bracteole. Drawn by Thawatphong Boonma.

Vernacular name: "Snow White", refers to the pure white color of the flowers, reminiscent of freshly fallen snow. Blooming in the morning, the flowers resemble snowflakes scattered on the forest floor.

Etymology: The specific epithet nivea is derived from Latin "niveus", meaning "snowy" or "snow-white," referring to the predominantly white color of the flower.

Habitat: *Curcuma nivea* is found in semi-open area in deciduous forest, thrives in sandy loam soil. Notable species in nearby areas include *Curcuma ubonensis* Boonma, Saensouk, Maknoi & P.Saensouk [27].

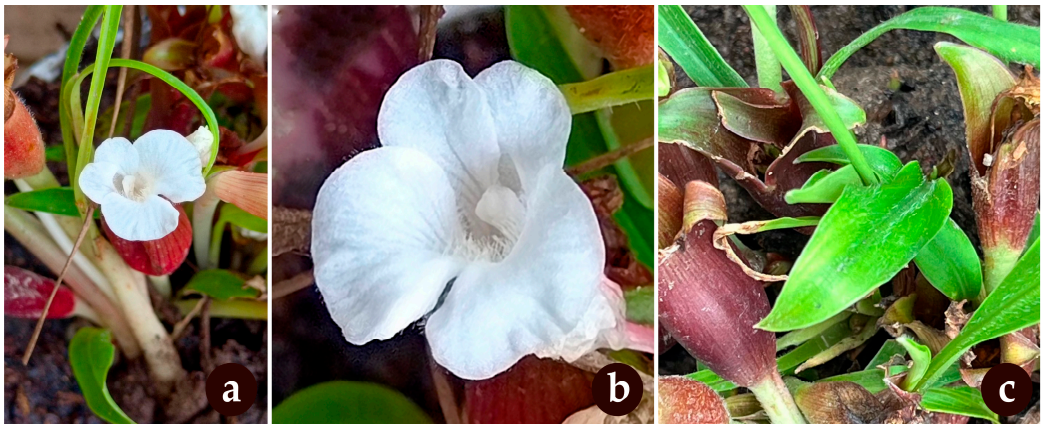

Figure 4. *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov.: (**a**) Habit; (**b**) Close-up flower; (**c**) Foliage showing hairy leaf surface. Photographs by Surapon Saensouk.

Phenology: This species enters dormancy from late November to March. After the initial rains, it begins to produce new shoots. Flowering typically occurs between April and June, with flowers blooming early in the morning and lasting for a single day.

Utilization: This species has been used as an ornamental potted plant.

Additional specimens examined: Thailand, Eastern, Ubon Ratchathani Province, Sirindhorn District, altitude c. 143 m a.s.l.: 22 April 2025, S.Saensouk and T.Boonma 25423 (spirit specimen, VMSU08902500, VMSU!); 22 April 2025, S.Saensouk and T.Boonma 25424 (spirit specimen, VMSU08902501, VMSU!); 6 May 2025, S.Saensouk and T.Boonma 25503 (spirit specimen, VMSU08900069, VMSU!); 6 May 2025, S.Saensouk and T.Boonma 25504 (dry specimen, VMSU08900074, VMSU!).

Curcuma nivea is clearly distinguishable from the closely related *C. pedicellata* [14] based on a combination of stable morphological characters, particularly those of the reproductive structures. Key differences include sessile flowers, a ciliate stigma, and the presence of pubescence on the bracts and other floral parts, all of which are glabrous in *C. pedicellata*. In addition, vegetative traits such as shorter leafy shoots and consistently pubescent sheaths and petioles provide further support for its distinctiveness. These consistent and non-overlapping characteristics observed across multiple individuals from natural populations confirm the recognition of *C. nivea* as a separate species rather than an intraspecific variant. A detailed morphological comparison between *C. nivea* and *C. pedicellata* [14] is presented in the table below (Table 1).

Table 1. Comparison of morphological characteristics between *Curcuma nivea* and its allied species.

Characteristic	*Curcuma pedicellata*	*Curcuma nivea* sp. nov.
Leafy shoot	15–30 cm tall	10–15 cm tall
Sheaths	2–3 in number, 4.0–8.0 × 0.6–0.8 cm, glabrous	2–4 in number, 2.5–8.5 × 1.0–1.2 cm, pubescent
Petioles	4.0–6.5 cm, glabrous	2.0–4.8 cm, pubescent
Ligule	0.2 cm long	0.05–0.1 cm long
Lamina	12.5–16.5 × 1.0–1.5 cm	5.5–11.0 × 0.4–1.0 cm
Leaf adaxial surface	Green with red midrib, glabrous	Green with green midrib, pubescent
Leaf abaxial surface	Green purplish	Pale green
Peduncle	3–6 cm long, glabrous	5.5–12.7 cm long, pubescent
Bracts	Glabrous	Pubescent

Table 1. *Cont.*

Characteristic	*Curcuma pedicellata*	*Curcuma nivea* **sp. nov.**
Bracteoles	1.0 × 0.1 cm, apex obtuse, glabrous	0.6–0.7 × 0.1 cm, apex acute, with few hairs at the tip
Flower pedicel	c. 0.3 cm long	Sessile
Calyx	Glabrous	Sparse hairs with a few short hairs at tip
Floral tube	c. 1.5 × 0.2 cm	1.8–2.5 × 0.14–0.18 cm
Dorsal corolla lobe	c. 1.0 × 0.4 cm, glabrous	1.0–1.1 × 0.5 cm, few hairs at tip
Lateral staminodes	White with yellow at base, pubescent inner side	Pure white, pubescent both sides
Labellum	1.8–2.0 × 1.3–1.5 cm, White with midlobe yellow and red blotch at the base	1.7–1.8 × 1.3–1.5 cm, White with two pale reddish lines at the base
Filament	c. 0.2 × 0.1 cm, glabrous	0.05 × 0.14 cm, pubescent
Anther	0.2–0.3 × 0.1–0.2 cm, glabrous	c. 0.5 × 0.2 cm, pubescent
Anther crest	Ovate, glabrous	Obovate–oblong, pubescent
Stigma	Glabrous	Ciliate
Fruits	White	Pale green

To distinguish the new species from other closely related species found in Thailand that have campanulate (bell-shaped) thyrses, we provide an identification key. This key, presented in Table 2, emphasizes the key morphological differences among these species, allowing for clear and accurate identification within the Thai flora.

Table 2. Key to species of *Curcuma* with campanulate thyrses in Thailand.

1a. Young leaves with rich red tinge on both surfaces	*Curcuma macrochlamys*
1b. Young leaves green on both surface or with very narrow red patch along the midrib on upper surface	2
2a. Involucral bracts are green throughout	3
2b. Involucral bracts are red or red with green apex	4
3a. Inflorescence cincinni with 15–20 flowers, pseudostem with 2–3 leaves	*Curcuma campanulata*
3b. Inflorescence cincinni with 6–8 flowers, pseudostem with 4–5 leaves	*Curcuma involucrata*
4a. Labellum without red	*Curcuma clovisii*
4b. Labellum with red	5
5a. Leaf sheaths and petioles pubescent; flowers sessile; labellum white with to pale reddish lines at the base	*Curcuma nivea*
5b. Leaf sheaths and petioles glabrous; flowers pedicellate; labellum white with yellow midlobe and red blotch at the base	*Curcuma pedicellata*

3.2. Economic Values

Our preliminary data from three local shops indicate that *Curcuma nivea* holds notable economic value. Individual plants are priced between 10–20 baht, excluding shipping costs. Each shop sells 100 to 200 plants monthly during the April to August sales period (4–5 months) annually. Consequently, the gross annual revenue from individual plants ranges from 4000 THB at the lower price point to 20,000 THB at the higher price. The exchange rate from 1 April to 31 August 2024 is approximately 1 US Dollar (USD) to 35.27 Thai Baht (THB). Shipping costs are separate and do not affect net revenue.

3.3. Conservation Status

Curcuma nivea is proposed to be classified as Vulnerable (VU) according to the IUCN Red List Categories and Criteria Version 16 (March 2024) [28]. This proposal is based on the species' known extent of occurrence (EOO), which is approximately 800 km^2, and its area of occupancy (AOO), which is confined to five locations totaling less than 5 km^2. The total population is estimated to be around 700 individuals. The species meets the Vulnerable criteria under the IUCN Red List, specifically criteria B1ab(i,ii,iv,v), which accounts for the continuing decline in the extent of occurrence, area of occupancy, number of locations, and number of mature individuals. Additionally, it meets criterion D2, indicating a population of fewer than 1000 mature individuals and its existence at no more than five locations. This preliminary assessment is subject to further field research and formal evaluation.

3.4. Cultivation Tips

Curcuma nivea has been cultivated as a compact ornamental potted plant by a small group of ginger enthusiasts. Due to its elegant form and predominantly white flowers, it has high potential for broader horticultural use. The species is particularly suitable for shaded gardens, balconies, or indoor environments with adequate light and humidity.

3.4.1. Light Requirements

Curcuma nivea thrives in semi-shaded areas, making it ideal for shaded gardens or as a decorative plant indoors. It should be protected from direct sunlight, which can damage its delicate flowers and cause stress to the plant. Indirect light is crucial for optimal growth and blooming.

3.4.2. Soil

The species prefers well-drained, fertile soil, and sandy loam mixture enriched with organic matter works best for healthy root growth. Avoid heavy, waterlogged soils to prevent root rot.

3.4.3. Watering

Regular watering is essential during the growing season, but the soil should not remain soggy. Consistent watering is necessary, but excess water should be drained away to prevent waterlogging. During the dormant phase, watering should be reduced, allowing the plant to dry out slightly.

3.4.4. Temperature

Curcuma nivea grows best in moderate temperatures and is sensitive to extreme cold. It enters dormancy during the winter months and should be protected from frost. In colder climates, it may be best to grow the plant in pots so it can be moved indoors during the winter months.

3.4.5. Fertilization

A slow-release fertilizer is recommended for *Curcuma nivea*. During the growing season, fertilizing every 4–6 weeks will support healthy growth. Organic matter should also be mixed into the soil to enhance its fertility. Fertilization should be reduced during the dormant period to prevent unnecessary growth.

3.4.6. Humidity

This species thrives in moderate humidity, as it naturally grows in deciduous forests where humidity is higher during the rainy season. Even during dormancy in winter, the plant retains moisture. However, during the summer, humidity levels decrease. Therefore,

the cultivation of *Curcuma nivea* should maintain appropriate humidity levels throughout different stages of growth. For potted ornamental cultivation, it is recommended to plant it in terracotta pots, which help retain moisture, preventing the soil from drying out too much in the summer and reducing the risk of rhizome desiccation. At the same time, avoid placing the plant in excessively humid areas during dormancy, as this could lead to rhizome rot.

3.4.7. Dormancy Care

In winter, *Curcuma nivea* enters a dormant phase. During this period, it should be kept in a dry, cool area. Watering should be reduced, and the plant can be allowed to rest. Dormancy is essential for the plant's life cycle and should be respected to promote future blooming.

4. Discussion

The discovery of *Curcuma nivea* Saensouk, P.Saensouk & Boonma sp. nov. contributes to the expanding diversity of *Curcuma* species in Thailand, a region renowned for its rich Zingiberaceae flora [19,23]. The absence of epigynous glands and anther spurs further distinguishes *C. nivea*, placing it firmly within the subgenus *Hitcheniopsis* of *Curcuma* [20,29–31], while other subgenera present epigynous glands and anther spurs [32–45]. This clarification is crucial for both advancing taxonomic understanding and highlighting the horticultural potential of this species.

Morphologically, *Curcuma nivea* is easily distinguished from its close relatives by several key traits, including its compact growth habit and the striking white flowers adorned with two reddish lines at the base of the labellum—distinct from the characteristic yellow blotch typically seen in other species [14,23].

In terms of horticultural potential, *C. nivea* has already gained popularity as an ornamental plant, particularly for cultivation in pots due to its compact size and attractive, white-flowered inflorescences. The species is ideal for decorative gardening in tropical and subtropical climates, making it a valuable addition to both private and commercial horticulture. This discovery highlights the potential for *Curcuma* species to contribute significantly to the ornamental plant trade, as evidenced by the growing interest in *C. nivea* among plant enthusiasts.

From a conservation perspective, the newly described species' limited distribution in eastern Thailand emphasizes the need for habitat preservation to protect these plants in their natural environment. Although *C. nivea* is currently not under significant threat, its restricted range and the increasing demand for ornamental *Curcuma* species could lead to pressures on wild populations. Future studies should focus on monitoring its population status and developing sustainable cultivation practices to reduce the risk of overharvesting from the wild.

The findings from this study also reinforce the importance of continued exploration of the *Curcuma* genus in Thailand and neighboring regions. There is a growing recognition of the need for comprehensive taxonomic surveys to identify and document new species before they are lost due to habitat destruction or overexploitation.

Future research should also investigate the ecological requirements of *C. nivea*, particularly its habitat preferences and potential responses to climate change. Understanding these factors will be crucial for developing effective conservation strategies and for the sustainable use of this species in ornamental horticulture.

In conclusion, *Curcuma nivea* is a noteworthy addition to the *Curcuma* genus, both taxonomically and horticulturally. Its distinct morphological characteristics and growing popularity as an ornamental plant underscore its significance. Continued exploration and

conservation efforts are vital to ensuring the survival of this species and to furthering our understanding of *Curcuma* biodiversity.

5. Conclusions

Curcuma nivea represents a significant addition to the diversity of *Curcuma* species in Thailand. Its distinct morphological traits, including the absence of epigynous glands and anther spurs, distinguish it from related species in the subgenus *Hitcheniopsis*. This new species not only expands our understanding of *Curcuma* taxonomy but also highlights its potential as an ornamental plant with compact growth and attractive flowers. The findings underscore the importance of ongoing exploration and documentation of Thailand's diverse Zingiberaceae flora. Future studies are needed to further investigate the ecological requirements and propagation methods of *C. nivea* to support its cultivation and potential commercial use in ornamental horticulture.

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