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Garcinia santisukiana (Clusiaceae), a new species from Thailand

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Summary. *Garcinia santisukiana* Ngerns. & Suddee (Clusiaceae), a new species discovered from Pha Taem National Park, Ubon Ratchathani Province, eastern Thailand, is described. A detailed description and illustration of the species are provided, along with information on recognition, distribution, specimens examined, habitat, conservation status, phenology, etymology, vernacular name and uses.

Key Words. Edible fruits, Pha Taem National Park, species nova, taxonomy.

Introduction

Garcinia L. is dioecious and the largest genus in the Clusiaceae (Guttiferae). It comprises nearly 400 accepted species, its native range is Tropics and Subtropics (POWO 2019) with centres of diversity in Southeast Asia and Madagascar (Sweeney & Rogers 2008). It is an important component of tropical forests. Significant previous studies on *Garcinia* revealed that India had 39 species (Maheshwari 1964; Singh 1993; Srivastava 1994; Sabu *et al.* 2013; Sarma *et al.* 2016; Shameer *et al.* 2017), British India 30 species (Anderson 1875), Sri Lanka 10 species (Kostermans 1980; Nimanthika & Kaththriarachchi 2010), China 20 species (Li *et al.* 2007), Indo-China 34 species (Gagnepain 1943), Peninsular Malaysia (Malaya) 49 species (Ridley 1922; Whitmore 1973), Java 8 species (Backer & Bakhuizen van den Brink 1963), Madagascar and the Comoros 32 species (Sweeney & Rogers 2008).

In Thailand, the genus *Garcinia* was enumerated by Craib (1931) with 20 species. Gardner *et al.* (2015) recorded 23 *Garcinia* species from Peninsular Thailand (including 5 unidentified species). Ngernsaengsaruay & Suddee (2016) described *G. nuntasaenii* as a new species from north-eastern Thailand.

A revision of the genus *Garcinia* has recently been undertaken by the first author as part of the *Flora of Thailand*. Dr Somran Suddee *et al.*, staff of BKF, first found and collected specimens with young fruits of a *Garcinia* species in February 2007 from deciduous dipterocarp forest, Pha Chana Dai, Pha Taem National Park, Na Pho Klang Subdistrict, Khong Chiam District, Ubon Ratchathani Province (*S. Suddee, P. Trisarasri, M. Thanaros & N. Ritphet* 3075). Suddee *et al.* then collected specimens with male flower buds of this species in November 2018 from the same place (*S. Suddee, P. Puudjaa, C. Hemrat & W. Keiwbang* 5393). During field work with staff (Miss Wassana Surawoot *et al.*) of Pha Taem National Park, in September 2020 we collected specimens with female flowers, mature and ripe fruits from dry evergreen forest, Dong Na Tham Forest (*C. Ngernsaengsaruay & W. Surawoot* G02-23092020, *C. Ngernsaengsaruay & W. Surawoot* G03-23092020, *C. Ngernsaengsaruay & W. Surawoot* G04-23092020), and then in December 2020 we collected male flowering specimens from deciduous dipterocarp forest, Pha Chana Dai (*C. Ngernsaengsaruay & W. Surawoot* G05-10122020). These specimens did not match any previously known species in Thailand or the surrounding regions and are described here as new to science.

Materials and Methods

The specimens collected were examined by consulting taxonomic literature, and by comparing with herbarium specimens deposited in the following herbaria AAU, BK, BKF, BM, C, K, P, PSU, QBG and SING including herbarium databases. The morphological characters are described from voucher specimens and also from the first author's own observations during field work in the type locality.

Taxonomic Treatment

Garcinia santisukiana *Ngerns. & Suddee*, **sp. nov.** Type: Thailand, Ubon Ratchathani Province, Khong Chiam District, Na Pho Klang Subdistrict, Pha Taem National Park, Dong Na Tham Forest, in dry evergreen forest, 420 m alt., 23 Sept. 2020, *C. Ngernsaengsaruay & W. Surawoot* G02-23092020 (holotype BKF!; isotypes A!,

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K!, specimens with female flowers, mature and ripe fruits from the same plant, dry and spirit collections).

http://www.ipni.org/urn:lsid:ipni.org:names:77219678-1

Evergreen tree 5 – 18 m tall, 20 – 85 cm girth; latex pale yellow, sticky; branches decussate, horizontal; branchlets 4-angular. *Bark* scaly, greyish-brown to dark brown; inner bark pale yellow. *Terminal bud* concealed between the bases of the uppermost pair of petioles. *Leaves* decussate; lamina elliptic or obovate, 2.7 – 9.7 × 1.5 – 4.3 cm, apex acute, sometimes retuse, base cuneate, margin entire, subcoriaceous, dark green above, paler below, glabrous on both surfaces, midrib flattened above, raised below, secondary veins 9 – 14 pairs, visible on both surfaces, curving towards the margin connected in distinct loops and united into an intramarginal vein, with intersecondary veins, tertiary veins reticulate, faint on both surfaces; glands black, visible on both surfaces, interrupted wavy lines, nearly parallel to the midrib, running across the secondary veins to the margin; petiole 0.5 – 1.3 cm long, shallowly grooved above, glabrous; fresh leaves crispy when crushed; young leaves red or reddish-brown, turning pale green, glossy. *Inflorescences* on branches at leafless nodes (in axils of fallen leaves), cymose, in fascicles of 3 – 5 flowers or solitary, opposite. *Flowers* 4-merous, lightly fragrant, 4 – 7 mm in diam.; bracts 4, decussate, green; sepals and petals decussate, sepals green, petals creamy white or pale yellow. *Male flowers* mostly in fascicles of 3 – 5 flowers; bracts triangular, 0.3 – 0.7 × 0.6 – 1 mm, apex acute; pedicel green, 1 – 2 mm long, 1 – 1.7 mm in diam., glabrous; sepals semiorbicular, c. 1 × 1 – 1.5 mm, apex rounded; petals obovate, 3 – 5 × 2.2 – 3.2 mm, concave, apex rounded; stamens numerous, in 4 bundles, opposite petals (antipetalous), 2 – 3 × 1.2 – 1.5 mm each bundle, creamy white; filaments very short; anthers very small; pistillode mushroom-shaped (fungiform), 3 – 3.6 mm long; stigma pale yellow. *Female flowers* solitary or in fascicles of 3 – 5 flowers; bracts semiorbicular, 0.8 – 1 × 1 – 1.5 mm, apex rounded; pedicel green, 1.5 – 2.5 mm long, 1.5 – 1.8 mm in diam., glabrous; sepals equal, semiorbicular, 1 – 1.5 × 1 – 2 mm, apex rounded; petals suborbicular or obovate, 3 – 4 × 2.5 – 3.5 mm, concave, apex rounded; staminodes in 4 bundles at the base of ovary, opposite petals; pistil mushroom-shaped; ovary green, subglobose, 1 – 2 × 1.8 – 2.2 mm; stigma pale yellow, sessile, hemispherical, 2 – 2.2 mm in diam., shallowly 4-lobed, papillate. *Fruit* a berry, subglobose or ovoid, 1.5 – 2.7 × 1 – 2.5 cm; green, turning red when ripe, glabrous, pericarp c. 0.8 mm thick; persistent sepals small; persistent stigma blackish brown, flattened, 2 – 2.2 mm in diam., shallowly 4-lobed; fruiting stalk 1.5 – 2.5 mm long. *Seeds* 1 – 2, mottled brown and pale brown, compressed, one side flat with conspicuous hilum, another side slightly convex, elliptic or oblong in outline, 1.5 – 2 × 1 – 1.5 cm, rounded at both ends, with yellow sarcotesta. Figs 1 and 2.

RECOGNITION. *Garcinia santisukiana* is similar to *Garcinia merguensis* Wight in having 4-merous flowers, sepals and petals decussate, stamens in 4 bundles, pistillode and pistil mushroom-shaped, stigma sessile and hemispherical, persistent sepals small, but differs in having pale yellow latex (vs white latex, turning pale yellow when exposed to the air); lamina elliptic or obovate, 2.7 – 9.7 × 1.5 – 4.3 cm, apex acute, sometimes retuse (vs lamina narrowly elliptic, elliptic or lanceolate-ovate, sometimes ovate, 6 – 12 × 1.5 – 5.5 cm, apex acuminate (tapering to a long tip), sometimes acute); fresh leaves crispy when crushed (vs fresh leaves not crispy when crushed); flowers 4 – 7 mm in diam. (vs flowers 6 – 10 mm in diam.); female flowers with staminodes in 4 bundles (vs female flowers without staminodes); pale yellow stigma (vs red or yellow stigma); fruits subglobose or ovoid, 1.5 – 2.7 × 1 – 2.5 cm; turning red when ripe (vs fruits globose or subglobose, 1.3 – 2 cm in diam., turning yellow when ripe); distribution: Thailand (but to be expected in Laos) (vs distribution: India, Bangladesh, Myanmar, Andaman Islands, Vietnam, Laos, Cambodia, Thailand, Peninsular Malaysia and Singapore).

DISTRIBUTION. Known only from Pha Taem National Park, Ubon Ratchathani Province, eastern Thailand, but to be expected in Laos.

ADDITIONAL SPECIMENS EXAMINED. THAILAND. Ubon Ratchathani: Pha Taem National Park, Pha Chana Dai, 28 Feb. 2007, *S. Suddee, P. Trisarasri, M. Thanaros & N. Ritphet* 3075 (paratypes BKF!); ibid., 7 Nov. 2018, *S. Suddee, P. Puudjaa, C. Hemrat & W. Keiwbang* 5393 (paratypes BKF!); ibid., 10 Dec. 2020, *C. Ngernsaengsaruay & W. Surawoot* G05-10122020 (paratypes BKF!, K!, male flowering specimens, dry and spirit collections); Ubon Ratchathani: Pha Taem National Park, Dong Na Tham Forest, 23 Sept. 2020, *C. Ngernsaengsaruay & W. Surawoot* G03-23092020 (paratypes A!, BKF!, K!, female flowering and fruiting specimens); ibid., 23 Sept. 2020, *C. Ngernsaengsaruay & W. Surawoot* G04-23092020 (paratypes BKF!, fruits in spirit collections).

HABITAT. In dry evergreen forest (Dong Na Tham Forest) and in deciduous dipterocarp forest on sandstone crevices (Pha Chana Dai), 400 – 420 m alt.

CONSERVATION STATUS. This species is known only from three small populations in the type locality which lies within a protected area, two in dry evergreen forest and one in deciduous dipterocarp forest on sandstone crevices. There doesn't appear to be an imminent threat to the plants or their habitat. It is assessed here as Least Concern (LC) following the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee 2019).

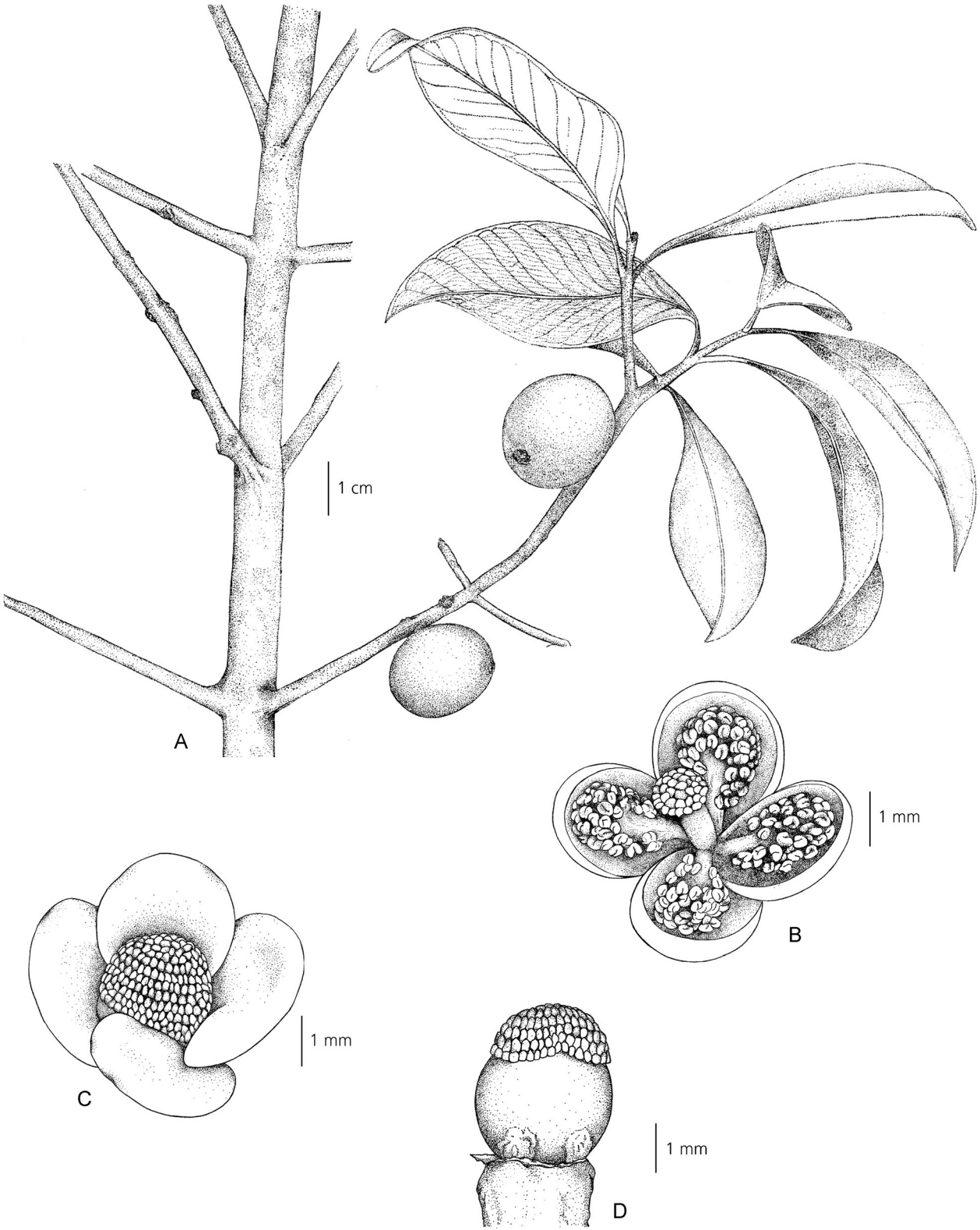

Fig. 1 *Garcinia santisukiana*. **A** branch, leaves and fruits; **B** male flower; **C** female flower; **D** female flower showing pistil and staminodes (sepals and petals removed). DRAWN BY PAWEENA WESSAPAK.

Fig. 2 *Garcinia santisukiana*. **A** outer bark; **B** outer bark and inner bark with pale yellow latex; **C** inflorescences with male flower buds; **D** male flower; **E** – **F** female flowers; **G** mature fruit; **H** branches, leaves and ripe fruits; **J** ripe fruits; **K** seeds with yellow sarcotesta; **L** seeds with sarcotesta removed. PHOTOS: **A** – **C, E** – **K** CHATCHAI NGERNSAENGSARUAY; **D** WASSANA SURAWOOT.

PHENOLOGY. Flowering July to December; fruiting August to October and February to April.

ETYMOLOGY. The specific epithet is in honour of the late Prof. Dr Thawatchai Santisuk (1944 – 2020), one of Thailand's most widely respected plant taxonomists. He taught the botany components of courses in plant systematics and advanced plant taxonomy when the first author was an undergraduate student and a graduate student at Kasetsart University. He was the former co-advisor of the first author in his doctoral degree at Kasetsart University. He was a superb botanist and ecologist, as well as, a brilliant teacher, actively involved in many aspects of botanical science in Thailand.

VERNACULAR NAME. Nuan santisuk (นวลสันติสุข) (suggested here); yang ueng (ยางอึง) (Ubon Ratchathani, local people around Dong Na Tham Forest).

USES. The ripe fruits are edible. The sarcotesta has a sweet and sour taste.

NOTES. The sarcotesta is fleshy layer surrounding the seed, developing from the outer seed coat (Beentje 2010). Glands on leaves can be observed under the stereo microscope. Wavy lines are visible on both surfaces especially on the lower surface of dry leaves.

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