



Orophea chalermpraiat (Annonaceae; Malmeoideae), a new species from southern Thailand

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Orophea Blume (1825: 18) (Annonaceae) consists of about 62 species distributed collectively from the Indian subcontinent through mainland Southeast Asia and southern China to the Southeast Asian islands (not further to the east than the Moluccas; Kessler 1988). It is a member of Miliuseae, the largest tribe of Malmeoideae (Chatrou *et al.* 2012). The genus is primarily characterised by the presence of (1) dissimilar petal whorls, the inner petals being usually longer, clawed toward the base and usually connivent at anthesis, (2) reduced number of stamens and carpels per flower and (3) loosely arranged stamens with a minute connective prolongation not covering the thecae (Damthongdee *et al.* 2021). Furthermore, most species of *Orophea* possess varying shapes of glands inside the inner petals (Kessler 1988, Leonardía & Kessler 2001). The genus has been subdivided into two subgenera: *Orophea* and *Sphaerocarpon* Kessler (1988: 13). Members of *O.* subg. *Orophea* possess generally percurrent tertiary leaf venation and ellipsoid-cylindrical to cylindrical monocarps (\pm moniliform when multi-seeded), whereas members of *O.* subg. *Sphaerocarpon* exhibit generally reticulate tertiary leaf venation and globose (rarely shortly oblongoid) monocarps (Damthongdee *et al.* 2021). In Thailand, there are eight species, including the recently described *O. sichaikhani* Damthongdee, Aongyong & Chaowasku (2021: 308). In this study, we describe a new species of *O.* subg. *Sphaerocarpon* from Satun UNESCO Global Geopark, Satun Province, southern Thailand. The indumentum terminology of Hewson (1988) was used. Floral organs were studied and measured from material in spirit.

Taxonomy

Orophea chalermpraiat Damth., Chanthamrong & Chaowasku, *sp. nov.* (Figs 1, 2)

Type:—THAILAND. Satun Prov.: Talu Cave, La-ngu Distr., 21 Nov 2020, fl. & fr., *Chaowasku 219* (holotype: CMUB003998801; isotypes: BK, CMUB, PBM, QBG).

The new species is morphologically most like *O. sichaikhani* but differs from it by having pilose-villous young twigs and petioles, shorter petioles, rounded to subcordate (rarely obtuse) leaf bases, shorter flowering pedicels, longer inner petal claws, lower number of carpels per flower and longer monocarp stipes (Table 1).

FLORA OF THAILAND

Herbarium of Department of Biology, Faculty of Science, Chiang Mai University (CMUB)

Family: Annonaceae

Botanical name: *Orophea chalermprakit* Damth., Chanthamrong & Chaowasku

Location: Talu Cave, La-ngu District, Satun Province

Habitat: Evergreen forests in limestone sink

Elevation: c. 25 m

Notes: A treelet c. 3 m tall; petals \pm cream at maturity, inner ones connivent at middle part at maturity and clawed toward base; submature monocarps light green

Date: 21 November 2020

Collected by: Tanawat Chaowasku

Number: 219



FIGURE 1. Holotype of *Orophea chalermprakit* (Chaowasku 219, CMUB).

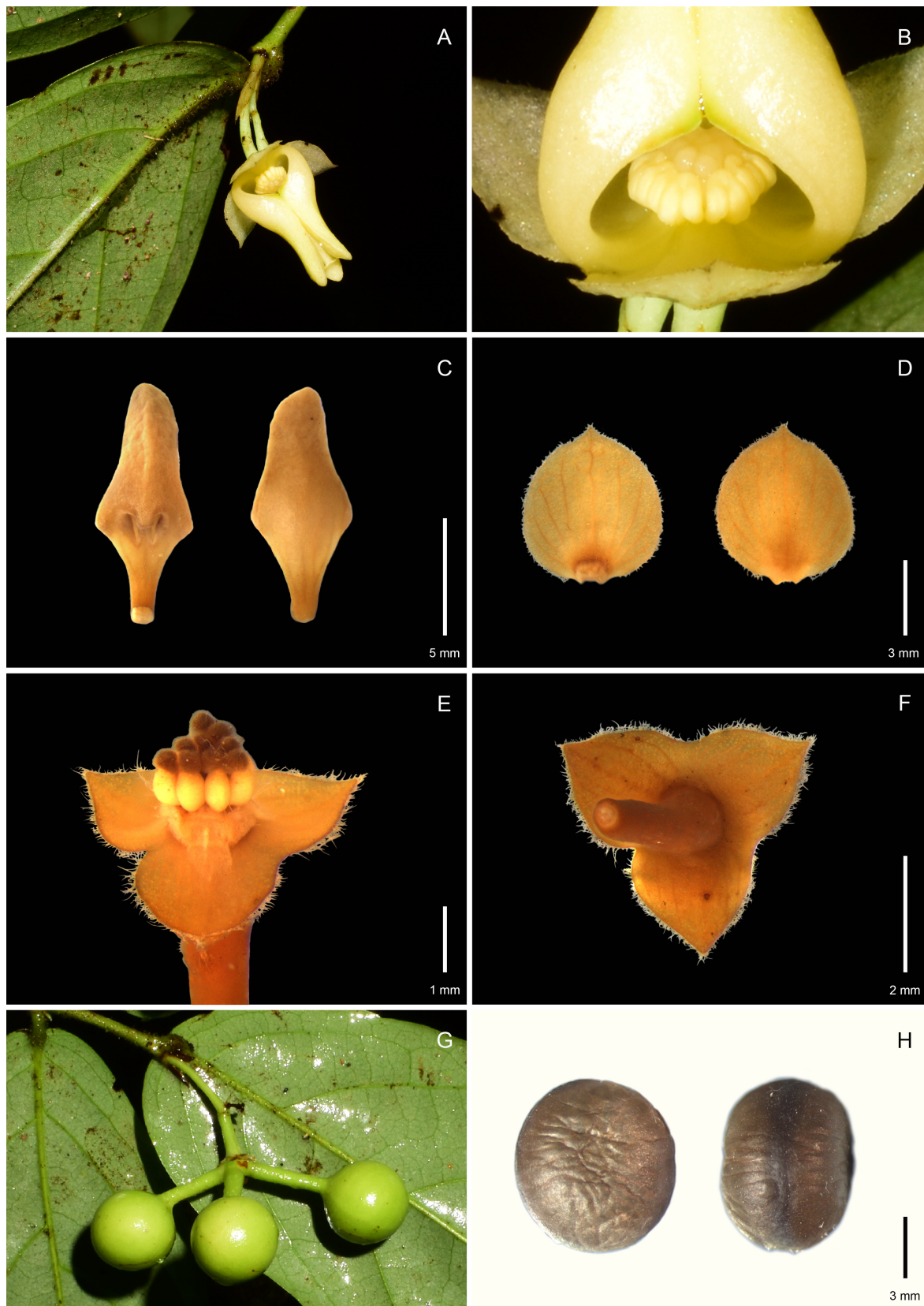


FIGURE 2. *Orophea chalermprakit*. A. Inflorescence and flower. B. Close-up of (A) in upright position, showing stamens surrounding carpels. C. Inner petal, adaxial (left) and abaxial (right) sides. D. Outer petal, adaxial (left) and abaxial (right) sides. E. Flower with petals and stamens removed, showing adaxial side of sepals and carpels on torus. F. Same as (E) but in bottom view, showing abaxial side of sepals. G. Infructescence and submature monocarps. H. Seed. A–F from *Chaowasku 219* (CMUB), G–H from *Chaowasku 223* (CMUB). C–F from spirit material. Photographs by A. Damthongdee (A, G).

TABLE 1. Main morphological differences between *Orophea chalermprakiat* and *O. sichaikhonii*.

Feature	<i>O. chalermprakiat</i>	<i>O. sichaikhonii</i>
Young twigs	pilose-villous with mostly erect hairs	glabrous or almost glabrous
Petiole	pilose-villous with erect hairs	glabrous
Petiole length (mm)	1.5–3.0	5.0–8.0
Leaf base	rounded to subcordate, rarely obtuse	cuneate to broadly cuneate
Pediceal length (mm; in flower)	4.5–6.5	10.5–15.0
Length of inner petal claw (mm)	3.1–3.6	1.5–2.0
Number of carpels per flower	9	11 or 14
Length of monocarp stipe (mm)	8.0–11.0	ca. 3.5

Treelets or trees 3–8 m tall. Young twigs pilose-villous with mostly erect hairs. Petiole 1.5–3.0 mm long, pilose-villous with erect hairs, slightly grooved above; leaf blade elliptic to obovate, 7.6–16.8 × 2.7–6.2 cm, glabrous above, puberulous-pilose (or slightly sparser) with appressed hairs below, base rounded to subcordate, rarely obtuse, apex caudate-acuminate (acumen usually 8.0–20.0 mm long); midrib slightly sunken above, glabrous, raised below, pilose with mostly appressed hairs; secondary veins 9–14 per side, prominent below, apical end of adjacent ones often joining into loops, angle with midrib 38°–45° (at middle part of leaf blade); tertiary veins reticulate, sometimes reticulate-percurrent. Inflorescences 2–6-flowered, axillary (sometimes leaf absent); peduncle 3.0–6.0 mm long, almost glabrous; rachis ca. 2.5 mm long when present, almost glabrous, bracts present; pedicel 4.5–6.5 mm long, almost glabrous, bearing 1 triangular bract at ± halfway between pedicel midpoint and sepals. Sepals nearly half-connate, ± broadly ovate-triangular, 1.8–2.1 × 1.8–2.2 mm, outside pilose with appressed hairs, margin villous with erect hairs, inside glabrous. Petals ± cream *in vivo* at maturity; outer petals broadly ovate to subcircular, 5.5–6.2 × 4.8–5.5 mm, outside almost glabrous, margin tomentose with erect and appressed hairs, inside glabrous; inner petals ± trullate, 10.5–11.7 × 3.6–4.2 mm, connivent at anthesis (but ± apical half of inner petals separate), apex obtuse, claw 3.1–3.6 mm long, outside of inner petals glabrous, margin glabrous only on claw and basal part of blade, remaining area puberulous-tomentose with mostly appressed hairs, inside puberulous-tomentose on bilateral midline on apical half of inner petals, middle part of inner petals (above nectary glands) curly-villous, remaining area glabrous, nectary glands on inside located on basal half of blade, paired short slits. Stamens 9 per flower, 1.0–1.3 mm long, staminodes absent. Carpels 9 per flower, 1.0–1.2 mm long; stigmas ± globose; ovaries almost glabrous; ovules 2 per ovary, lateral, uniseriate. Torus slightly elevated, flat-topped, puberulous-pilose with erect hairs. Monocarps up to 9 per fruit, globose, rarely shortly oblongoid, 9.0–12.0 × 9.0–10.5 mm, smooth (but wrinkled when dry) and glabrous, stipe 8.0–11.0 mm long, glabrous, often attached obliquely to monocarps; fruiting pedicel up to 10.0 mm long. Seed(s) 1–2 per monocarp, ± subglobose (but flattened on one side when there are two seeds in a monocarp), ca. 9.0 × 7.0 mm, smooth (but somewhat wrinkled when dry).

Etymology:—Derived from a Thai royal term meaning “honour”, the specific epithet honours King Rama X of Thailand on the auspicious occasion of his 72nd (6th cycle) birthday anniversary (28 July 2024).

Distribution:—Endemic to Satun Province, southern Thailand.

Habitat and phenology:—Evergreen forests in a limestone sink, ca. 25 m. Flowering and fruiting material collected in November.

Additional specimens examined (paratypes):—Same location and date as the type specimens, *Chaowasku 220* (CMUB), fl. (young) & fr.; *Chaowasku 221* (CMUB), fr.; *Chaowasku 222* (CMUB), fl. (young) & fr.; *Chaowasku 223* (CMUB), fr.

Notes:—Although not less than 15 mature individuals of *O. chalermprakiat* have been observed, we believe more exploration on nearby karst areas may uncover additional individuals. Consequently, the category data deficient (DD; IUCN Standards and Petitions Committee 2022) is suitable here.

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References

- Blume, C.L. (1825) *Bijdragen tot de flora van Nederlandsch Indië*, part 1. Ter Lands, Jakarta, pp. 1–42.
<https://doi.org/10.5962/bhl.title.395>
- Chatrou, L.W., Pirie, M.D., Erkens, R.H.J., Couvreur, T.L.P., Neubig, K.M., Abbott, J.R., Mols, J.B., Maas, J.W., Saunders, R.M.K. & Chase, M.W. (2012) A new subfamilial and tribal classification of the pantropical flowering plant family Annonaceae informed by molecular phylogenetics. *Botanical Journal of the Linnean Society* 169: 5–40.
<https://doi.org/10.1111/j.1095-8339.2012.01235.x>
- Damthongdee, A., Aongyong, K. & Chaowasku, T. (2021) *Orophea sichaikhani* (Annonaceae), a new species from southern Thailand, with a key to the species of *Orophea* in Thailand and notes on some species. *Plant Ecology and Evolution* 154: 307–315.
<https://doi.org/10.5091/plecevo.2021.1780>
- Hewson, H.J. (1988) Plant indumentum. *A handbook of terminology. Australian Flora and Fauna Series* 9: 1–27.
- IUCN Standards and Petitions Committee. (2022) *Guidelines for using the IUCN Red List categories and criteria*. Version 15.1. Prepared by the Standards and Petitions Committee. Available from: https://nc.iucnredlist.org/redlist/content/attachment_files/RedListGuidelines.pdf (last accessed March 2023)
- Kessler, P.J.A. (1988) Revision der Gattung *Orophea* Blume (Annonaceae). *Blumea* 33: 1–80.
- Leonardía, A.A.P. & Kessler, P.J.A. (2001) Additions to *Orophea* subgenus *Sphaerocarpon*: revision and transfer of *Mezzettiopsis*. *Blumea* 46: 141–163.