

Balanophora papuana (Balanophoraceae), a newly recorded species for Thailand

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ABSTRACT

This paper presents a new record to the flora of Thailand: *Balanophora papuana*. The species is characterised by its unique morphology, notably a tuber that branches into numerous small ovoid to sub-globose tubers, each with a verrucose surface. Additionally, the species exhibits a distinct opposite decussate phyllotaxy with 4–5 leaves. A morphological description, distribution, ecology, vernacular name, and illustration of the species are provided, based on female herbarium specimens collected from Narathiwat and Yala Provinces, Southern Thailand.

KEYWORDS: biodiversity, flora of Thailand, new record, Peninsular Thailand, root-holoparasite, taxonomy.

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INTRODUCTION

Balanophora J.R.Forst. & G.Forst., the largest genus within Balanophoraceae, comprises approximately 15 to 25 accepted species (Luu *et al.*, 2020, POWO, 2023). This root-holoparasitic genus, typically found in lowland evergreen forests up to montane rain forests, spans tropical Africa, temperate to tropical Asia, Australia, and the Pacific Islands (Hansen, 1972a, POWO, 2023). The genus is characterised by its achlorophyllous parasitic habit with unisexual florets, with plants being either monoecious or dioecious (Hansen, 1972a). Their highly reduced morphological characteristics make it difficult to distinguish them at lower taxonomic levels (Su *et al.*, 2012), and the number of species may change when molecular phylogenetic studies of this genus are undertaken. Previously, six taxa were reported in Thailand: *B. abbreviata* Blume, *B. fungosa* subsp. *indica* (Arn.) B.Hansen, *B. fungosa* var. *minor* (Eichler) B.Hansen, *B. harlandii* Hook.f., *B. latisejala* (Tiegh.) Lecomte, and *B. laxiflora* Hemsl. (Hansen, 1972b). A recently new record of a species from Northern Thailand, *B. subcupularis* Tam, has been identified as a seventh member of the genus in Thailand (Chaiwerawattana *et al.*, 2022).

During a taxonomic revision of the genus

Balanophora, a distinctive *Balanophora* species was discovered among the herbarium specimens deposited in BKF. This species differs from all previously known from Thailand by having a verrucose tuber branching into many small tubers, with inflorescences subtended by 4–5 leaves. After a thorough comparison with relevant literature and a lectotype, it was identified as *B. papuana* Schltr., marking a new record for Thailand. The current manuscript provides morphological description along with the illustration of this species from Thailand.

MATERIALS AND METHODS

Morphological description and illustration were prepared based on two specimens from Peninsular Thailand, housed in BKF. The taxonomic monograph of *Balanophora* (Hansen, 1972a) was used as the main reference for identification. Specimens of *Balanophora* kept at BK, BKF, KKU, PSU, and QBG were investigated for comparison. Morphological characters were described using stereo and compound light microscopes, and line drawings of prominent characters were illustrated with a Sketchbook program on the electronic device.

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TAXONOMIC TREATMENT

Balanophora papuana Schltr., Bot. Jahrb. Syst. 50(4): 68, Fig. 1. 1913. Type: Papua New Guinea, in the humus of the forests of the Bismarck Mountains, 1,400 m elev., 1 Nov. 1908, *R. Schlechter 18602* (lectotype **K** [K000674591-image!], designated by Hansen [1972a]; isoelectotype **P** [P06619693-image!]). Figs. 1–2.

Dioecious root-parasite plant, length from tuber to inflorescence apex 2.7–4 cm tall, reddish, herbaceous. *Tubers* in a mass, sub-globose, 7–11 cm in diameter, branched from the base into more than 60 single tubers; single tubers ovoid to sub-globose, 3.3–4.2 × 1–1.3 cm, dehiscent cupuliform when flowering, pale yellow to reddish, bullate, covered with polygonally verrucose surface and scattered

pale-yellow stellate warts. *Scapes* placed in concavity of cupuliform tuber, 0.5–1 × 0.3 cm, reddish to yellowish. *Leaves* 4–5, elliptic to oblong, reddish with yellowish margin, sessile, opposite decussate to spiral, cucullate, 0.8–1.7 × 0.7–0.9 cm, apex rounded or emarginate, margin entire, covering the inflorescences and patent during anthesis. *Male inflorescences* not seen. *Female inflorescences* obovoid or sub-globose, 1.0–1.2 × 0.6–0.8 cm, reddish. *Female florets* numerous, clear white, without perianth, single ovary and style; pistils occurring at base of spadicles and inflorescences axis, pedicellate; ovary obovoid to prolate, 0.2–0.25 × 0.1–0.14 mm; styles 0.27–0.33 mm long. *Spadicles* claviform, 0.38–0.45 × 0.2–0.4 mm, reddish, stipitate; stalk of spadicles 0.08–0.25 mm long.



Figure 1. *Balanophora papuana* Schltr.: A. habit; B. female inflorescence occurring on the rhizome. Photos of specimen *Poopath 169* (BKF) taken by Manop Poopath.

Thailand.— PENINSULAR: Yala [Khao Pi Sat, Hala-Bala, 1,000–1,250 m elev., 1 May 1998, *Niyomtham & Puudjaa 5512 (BKF)*]; Narathiwat [Waeng, Lochut, Ban Bala, Hala-Bala Wildlife Sanctuary, Line 8th of the wildlife research station, 550 m elev., 11 Sept. 2004, *Poopath 169 (BKF)*].

Distribution.— Thailand, Indonesia (Kalimantan, Papua, Seram, Sulawesi, and Sumatra), Malaysia (Peninsular Malaysia and East Malaysia), Papua New Guinea, Philippines (Luzon, Mindanao, and Mindoro) (Hansen, 1972a; Damayanto & Riastiwi, 2019; POWO, 2023).

Ecology.— Lowland evergreen to montane rain forests, at elevations between 300–2,500 m (Hansen 1972a).

Vernacular.— Khanun din papua new guinea (ขนนดินปาปัวนิวกินี) (name proposed here by the last author), “Khanun din” means *Balanophora* in general in Thai, and “Papua New Guinea” refers to the type locality and its specific epithet.

Notes.— *Balanophora papuana*, a Malesian species, bears similarity to many species found in Thailand. A morphological comparison with the two similar species of genus *Balanophora* in Thailand is provided in Table 1. The number of leaves varies between areas; specimens found in Thailand have 4, infrequently 5, which is similar to those specimens found in Papua New Guinea and Sulawesi (Hansen, 1972a). The species is reported here in Southern Thailand providing a new northern limit of distribution for Sundaic subregions (Woodruff, 2003).

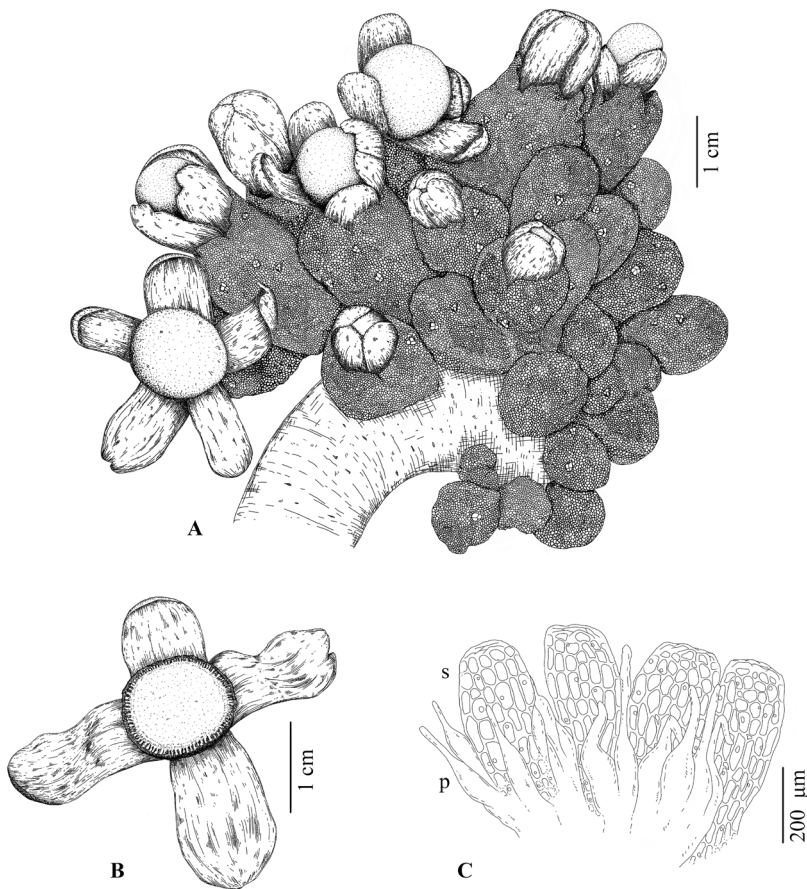


Figure 2. *Balanophora papuana* Schltr.: A. a plant with inflorescences sprouting from small tubers that branch from main tuber; B. a transverse section of female inflorescence, subtended by four leaves; C. pistils (p) occurring at the base of spadicle(s). All from *Poopath 169 (BKF)*. Drawn by Nithit Chaiwerawattana.

Table 1. Morphological comparison of similar species of genus *Balanophora* in Thailand.

Morphological Features	<i>B. papuana</i>	<i>B. fungosa</i> subsp. <i>indica</i>	<i>B. harlandii</i>
Plant colour	reddish and some parts yellowish	reddish to creamy yellowish	reddish to pinkish
Tuber surface	polygonally verrucose	granular	granular
Number of leaves	4(–5)	6–8	6–12
Phyllotaxis	opposite decussate	alternate spiral	decussate or subopposite
Female inflorescence shape	obovoid or sub-globose	depressed-ellipsoid or subspherical	sub-spherical or ovoid
Pistil occurrence	situated on the base of spadices and main axis of the inflorescence	situated on the cylindrical part of spadices and main axis	situated on the main axis only

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