A new species of *Phyllanthus chayamaritiae* (*Phyllanthaceae*) from Thailand

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**Key words**

*Phyllanthaceae*

*Phyllanthus chayamaritiae*

Thailand

**Abstract**

*Phyllanthus chayamaritiae* from north-eastern and eastern Thailand is described and illustrated as a new taxon. It is distributed in open places in deciduous forests. The new taxon is characterised by the long spine-like capsule. An identification key to the species and morphologically related species is provided.

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**INTRODUCTION**

The genus *Phyllanthus* L. (*Phyllanthaceae*) consists of c. 700 species (Radcliffe-Smith 2001), mainly distributed in the tropics and subtropics. The family *Phyllanthaceae* is most notable for being biovulate and it has been segregated from *Euphorbiaceae* s.l. based on molecular evidence (APG II 2003). The first revision of the Thai species of the genus was the treatment of Airy Shaw for the *Euphorbiaceae* of Siam (Thailand) (Airy Shaw 1972), who recognised 31 species in *Phyllanthus*. Later Chantaranothai (2007) published 36 species of the genus in Thailand.

**MATERIAL AND METHODS**

**Morphological study**

Field collections and herbarium material were studied. The morphological characteristics of the specimens described herein as *P. chayamaritiae* sp. nov. were compared with those of the similar species, *P. amarus* Schumach. & Thonn. and *P. urinaria* L. Voucher specimens are deposited at KKU. Additional materials have been examined and consulted from the following herbaria (abbreviations according to Thiers 2011): AAU, BCU, BK, BKF, C, CMU, K, KKU, L, PSU, QBG, TCD and the Herbarium of the Department of Biology, Chiang Mai University, Thailand.

**Anatomical and SEM studies**

Living material of *P. amarus*, *P. chayamaritiae* and *P. urinaria* was fixed and preserved in 70 % ethanol. Stem internodes used were the sixth, seventh and eight from the apex of each specimen. The samples were dehydrated in an ethanol series (70 %, 85 % and 96 %, respectively), embedded in Technovit 7100 polymerizing resin (Heraeus Kulzer GmbH, Germany), then stained with Ruthenium red and Toluidine blue. The sections sectioned with rotary microtomes at 6–8 μm thickness and then washed off with distilled water. The samples were then dehydrated by alcohol series, cleared with pure xylene and mounted in the DePeX artificial mounting medium.

For scanning electron microscopy (SEM), the capsules of three species were fixed in 70 % (v/v) ethanol, dried and then mounted directly on stubs using double-sided adhesive tape. The stubs were coated with gold-palladium for 5 min in a Sputter Coater Balzers SCD 040. The capsules were observed with a JEOL JSM-6390 SEM.

Voucher specimens for anatomical and SEM studies.


**DESCRIPTION OF THE SPECIES**

### *Phyllanthus chayamaritiae* Chantar. & Kantachot, sp. nov. —

Fig. 1, 2, 3c, d


Etymology. The name of the species honours Dr Kongkanda Chayamarit, the head of the *Euphorbiaceae* project for the Flora of Thailand.

Annual herb up to 70 cm high; branchlets angled, glabrous. **Stipules** lanceolate or ovate-lanceolate, 0.3–1 mm long. **Leaves**: petiole 0.2–0.8 mm long; blade oblong, elliptic-oblong or obovate, 2.6–11 by 1.3–5 cm, chartaceous or subcoriaceous, finely puberulous on both sides, base slightly unequal, obtuse or rounded, margin entire and finely puberulous, apex obtuse or rounded and apiculate; lateral veins in 3–4 pairs; reticulation inconspicuous on both sides. **Flowers** axillary, mostly bisexual fascicles; first 1 or 2 axils with staminate flowers, succeeding axil each with 1 pistillate flower and 1 staminate flower and the last 1 or 2 axils of the distal axils with 1 pistillate flower. **Staminate flowers**: pedicels 0.5–1 mm long; sepals 6, ovate or elliptic, 0.2–0.7 by 0.1–0.4 mm, light yellowish; disc glands 6, star-shaped or orbicular; stamens 3, staminal column 0.1–0.3 mm long, anthers 0.1–0.3 mm long. **Pistillate flowers**: pedicels...
Table 1  Comparison between Phyllanthus chayamaritiae and morphologically related species (Fig. 3).

<table>
<thead>
<tr>
<th>Character</th>
<th>P. chayamaritiae</th>
<th>P. amarus</th>
<th>P. urinaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepal number</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Capsule surface</td>
<td>with long spines</td>
<td>glabrous</td>
<td>scurfy-tuberculate</td>
</tr>
<tr>
<td>Apex of pistillate flower</td>
<td>acute</td>
<td>acute</td>
<td>obtuse or orbicular</td>
</tr>
<tr>
<td>Pistillate pedicel length (mm)</td>
<td>0.7–1.2</td>
<td>0.7–1.2</td>
<td>0.1–0.4</td>
</tr>
<tr>
<td>Ovary</td>
<td>with long spines</td>
<td>glabrous</td>
<td>tuberculate</td>
</tr>
<tr>
<td>Stomatal type</td>
<td>paracytic</td>
<td>anomocytic</td>
<td>paracytic</td>
</tr>
<tr>
<td>(rarely paracytic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem diameter (mm)</td>
<td>0.6–1.0</td>
<td>1.5–2.0</td>
<td>1.5–2.2</td>
</tr>
<tr>
<td>Stem outline in transverse section</td>
<td>semicircular with ridge</td>
<td>circular</td>
<td>semicircular with ridge</td>
</tr>
<tr>
<td>Number of hypodermis layers</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
0.7–1.2 mm long; sepals 6, obovate-oblong or lanceolate, 0.3–0.8 by 0.2–0.5 mm, glabrous, apex acute with broad whitish scarious margin; disc glands 6; ovary covered with soft spine-like hairs; styles 0.1–0.2 mm long; stigma c. 0.1 mm long.

Fruits: pedicel 1.5–2 mm long, 0.8–2 mm diam, capsular, depressed globose, covered with soft spine-like hairs, light green or light yellowish green. Seeds trigonous, 0.5–1.2 by c. 1 mm wide, with 2 hollows on the sides.


Habitat & Ecology — Phyllanthus chayamaritiae occurs in open places of deciduous forests with stone bedrock habitat, at 300–600 m a.s.l. The populations cover restricted areas of only 15–40 m² and are growing together with Amalocalyx microlobus Pierre ex Spire (Apocynaceae), Crotalaria sp. (Fabaceae), Droogmansia godefroyana Schindl. ex Gagnep. (Fabaceae), Eriocaulon echinulatum Mart. (Eriocaulaceae), Fimbri-stylis dichotoma (L.) Vahl (Cyperaceae), Justicia diffusa Willd. (Acanthaceae), Lindernia kerrii T.Yamaz. (Schrophulariaceae), Tephrosia vestita Vogel (Fabaceae) and Xyris sp. (Xyridaceae).
Phenology — Flowering occurs from June to September and fruiting from July to November.


Note — The morphological, anatomical and SEM investigations (Table 1) show the characters of \textit{P. chayamaritiae} as compared with \textit{P. amarus} and \textit{P. urinaria}. However, \textit{P. chayamaritiae} differs from other species in having long spine hairs on the capsule, and ovary and absence of druses in pith. It is found in Sakon Nakhon, Khon Kaen and Ubon Ratchathani provinces in north-eastern and eastern Thailand whereas \textit{P. amarus} and \textit{P. urinaria} are widespread through the country.

KEY TO PHYLANTHUS CHAYAMARITIAE AND MORPHOLOGICALLY RELATED SPECIES

1. Sepals 5............................... \textit{P. amarus}
2. Capsule scurfy-tuberulate .............. \textit{P. urinaria}
3. Capsule spiny .......................... \textit{P. chayamaritiae}

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REFERENCES