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The leaf insect genus *Pulchriphyllium* Griffini, 1898 from Thailand: new distribution record with notes on species (Phasmatodea: Phylliidae)

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Abstract

The leaf insect *Pulchriphyllium giganteum* (Hausleithner, 1984) is recorded in Thailand for the first time. The diagnosis, measurements, photographs, and short notes of the specimens are also provided.

Keywords
Phasmatodea, Phylliidae, *Pulchriphyllium*, Thailand, Leaf insect

Introduction

The leaf insects are well-known, as they are the master of camouflage in nature, due to their coloration and leaf-like shape. They are widely distributed across the tropical region of Asia, Australia, and the Pacific (Bank *et al*., 2021a; Brock *et al.,* 2022). The genus *Pulchriphyllium* Griffini, 1898 is one of the spectacular and fascinating genera from the ten genera of Phylliidae, comprising 14 described species (Table 1): *Pulchriphyllium abdulfatahi* (Seow-Choen, 2017), *P. agarthyrsus* (Gray, 1843), *P. agnesagamaae* (Seow-Choen, 2017), *P. bioculatum* (Gray, 1832), *P. detlefgroesseri* (Seow-Choen, 2017), *P. fredkugani*

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(Seow-Choen, 2017), *P. giganteum* (Hausleithner, 1984), *P. lambirense* (Seow-Choen, 2017), *P. maethoraniae* (Delfosse, 2015), *P. mannani* (Seow-Choen, 2017), *P. pulchifolium* (Audinet-Serville, 1838), *P. rimiae* (Seow-Choen, 2017), *P. shurei* (Cumming & Le Tirant, 2018) and *P. sinense* (Liu, 1990) (Bank *et al*., 2021a; Brock *et. al.,* 2022). Only one species, *P. maethoraniae* was described and recorded from northern Thailand.

Recently, during an expedition in the extreme south of Thailand to document the entomofauna and herpetofauna of the country, a scientifically significant specimen of leaf insect was discovered and showed a remarkable shape and gigantic size. The specimen was checked and confirmed as *P. giganteum* which has a wide range of distribution on the continent and islands of Southeast Asia (Seow-Choen, 2021). This article documents the new distribution with notes on the species in Thailand.

Materials and Methods

The specimen was observed and collected at night. A water-proof head torch (Fenix HL60R) was used during surveying. The female was kept alive in a mesh to produce eggs. The specimen examined in this study is deposited in Natural History Museum, National Science Museum, Thailand, Pathum Thani Province, Thailand (THNHM).

The pictures were taken with a Canon 7D mark II camera equipped with the EF 100 mm f/2.8 Macro USM lens and stacked with Adobe Photoshop CC 2019. The measurements mainly followed Cumming *et al*. (2021).

The distribution map was produced with QGIS software.

Taxonomy

Family Phylliidae Brunner von Wattenwyl, 1893
Subfamily Phylliinae Brunner von Wattenwyl, 1893
Tribe Phylliini Brunner von Wattenwyl, 1893
Genus *Pulchriphyllium* Griffini, 1898

Type species: *Phyllium pulchrifolium* Audinet-Serville, 1838

Pulchriphyllium was originally described as subgenus of *Phyllium* Illiger, 1798, but in the supplementary article of Bank *et al*. (2021b), it was considered a full genus. The genus can be distinguished from the other genera by the presence of the exterior lobes of meso- and metatibiae. Tegmina of male is short and reaches to the posterior margin of abdominal segment II. Alae of female is not developed. Eggs have lamellated longitudinal carinae; without hair-like structures; operculum conically (Hennemann *et al.*, 2009; Bank *et al.*, 2021b).

Table 1. List of species and distribution (Brock *et al.*, 2022).

Species	Distribution
P. abdultafaihi	Indonesia (Sumatra) and Malaysia (Peninsular Malaysia and Sabah).
P. agathyrsus	Sri Lanka
P. agnesagamaae	Malaysia (Sabah)
P. bioculatum	China, India, Indonesia (Java and Sumatra), Peninsular Malaysia, Singapore, and Sri Lanka
P. detlefgroesseri	Malaysia (Sabah)
P. fredkugani	Malaysia (Sabah)
P. giganteum	Indonesia (Sumatra), Malaysia (Peninsular Malaysia, Sabah and Sarawak) and South Thailand (**new country record**)
P. lambirense	Malaysia (Sarawak)
P. maethoraniae	Thailand
P. mannani	Malaysia (Peninsular Malaysia and Sabah).
P. pulchrifolium	Indonesia (Java and Sumatra)
P. rimiae	Malaysia (Peninsular Malaysia and Sabah).
P. shurei	Indonesia (Java)
P. sinense	China

***Pulchriphyllium giganteum* (Hausleithner, 1984)**

(Figure 1)

Phyllium giganteum Hausleithner, 1984: 39, figs 1–3. Type locality: Peninsular Malaysia.

Material examined. One female (THNHM), S Thailand, Yala Province, Betong District, 5°53’35.8”N 101°02’57”E, 30.IV.2022, P. Pawangkhanant leg.

Diagnosis. The species can be recognized by the very large body size, strongly broad at tergum IV, and the apex of the lateral margin of tergum VII slightly protruding, gonapophyses long, reaching very near to or to the apex of the anal abdominal segment. The measurements see Table 2.

Remarks. *Pulchriphyllium giganteum* is widely distributed across the Sunda Shelf (Cumming *et al*., 2018; Cumming *et al*., 2020; Seow-Choen, 2021). In Thailand, this species is only known from the southernmost part of the country in Yala Province. The specimen was collected at night from a shrub tree, *Syzygium* sp. (Myrtaceae) ca. 6 meters above ground (iNaturalist: https://www.inaturalist.org/observations/115575461).

Distribution. Indonesia (Sumatra), Malaysia (Peninsular Malaysia, Sabah and Sarawak), and South Thailand (**new country record**).

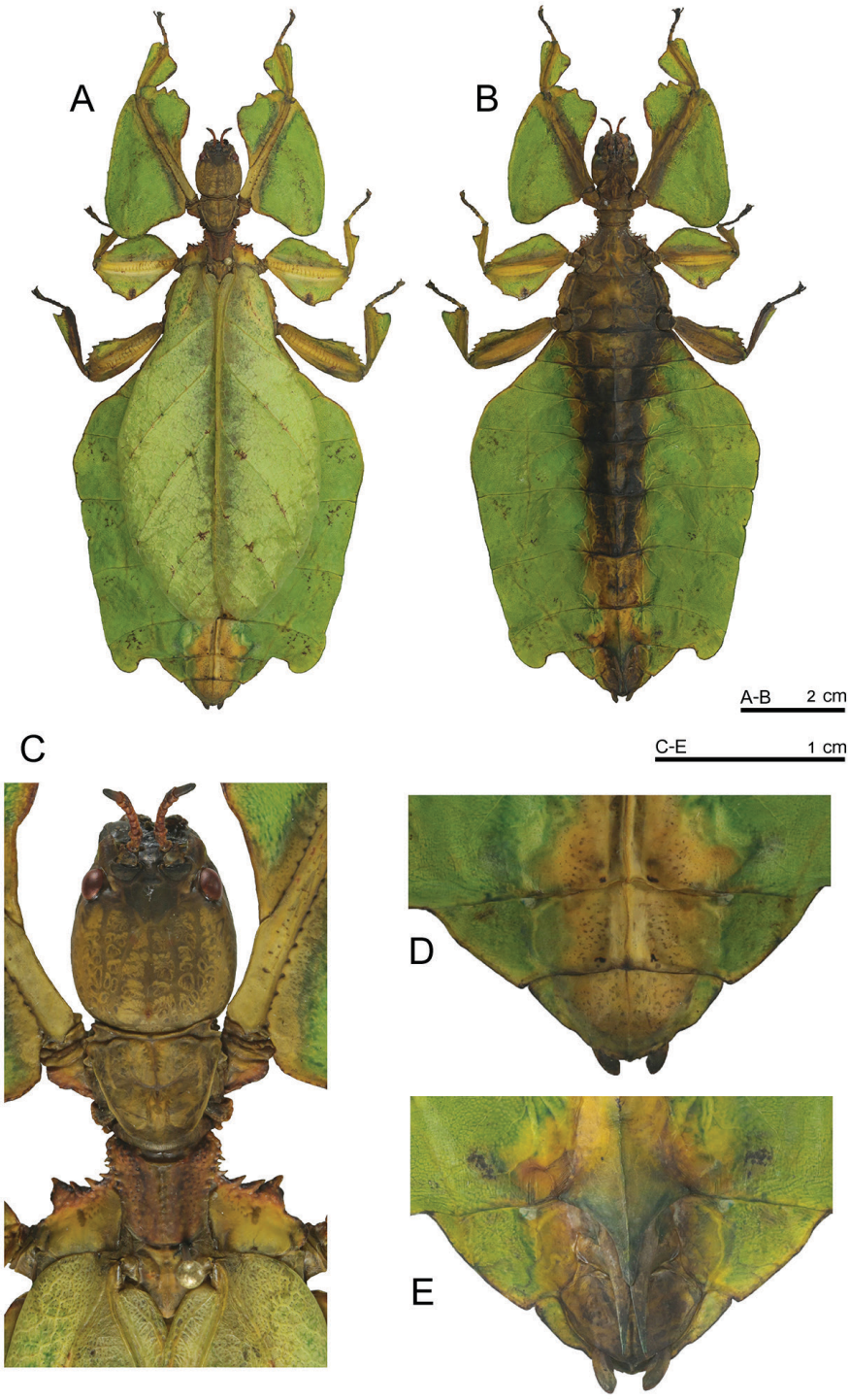

Figure 1. *Pulchriphyllium giganteum* (Hausleithner, 1984) female from Yala Province, Thailand. A, habitus, dorsal view. B, habitus, ventral view. C, head and thorax. D, terminalia, dorsal view. E, terminalia, ventral view.

Discussion

Currently, two species of the genus *Pulchriphyllium*: *P. giganteum* (Yala Province, south Thailand) and *P. maethoraniae* (Chiang Mai Province, north Thailand) are known from Thailand. *Pulchriphyllium giganteum* has a wide distribution range on the Sunda Shelf (Cumming *et al.*, 2018; Cumming add *et al*., 2020; Seow-Choen, 2021), especially for Peninsular Malaysia. This species was usually found in lowland evergreen forest: such habitat also can be found in southern Thailand. We found a specimen of *P. giganteum* from the southernmost Thailand. However, the discovery of *P. giganteum* in Thailand shows the lack of intense surveys of leaf insects in the country or *P. giganteum* is possibly rare in the area. The lowland evergreen forest habitat in south Thailand is very similar to the habitat in Peninsular Malaysia. The Malaysian species (*P. abdulfatahi*, *P. bioculatum P. mannani,* and *P. rimiae*) can be expected to occur in southern Thailand. The citizen scientists and relevant government agencies in the area are essential, having knowledge about the local fauna and can repeatedly survey areas that would be inaccessible to scientists. Thus, collaboration with citizen scientists can help scientists to get more new data and new discoveries about entomofauna.

Table 2. Measurements of a *Pulchriphyllium giganteum* specimen from Yala Province, Thailand.

Parts of body	Length (mm)	Width (mm)
Body	115.5	
Head	13.4	9.6
Antennae	4.4	
Pronotum	7.1	
Mesonotum	8.8	
Tegmina	71.6	
Profemora	31.3	
Mesofemora	18.6	
Metafemora	20.2	
Protibiae	13.2	
Mesotibiae	12.1	
Metatibiae	18.1	
Abdomen (Widthest)		58.6

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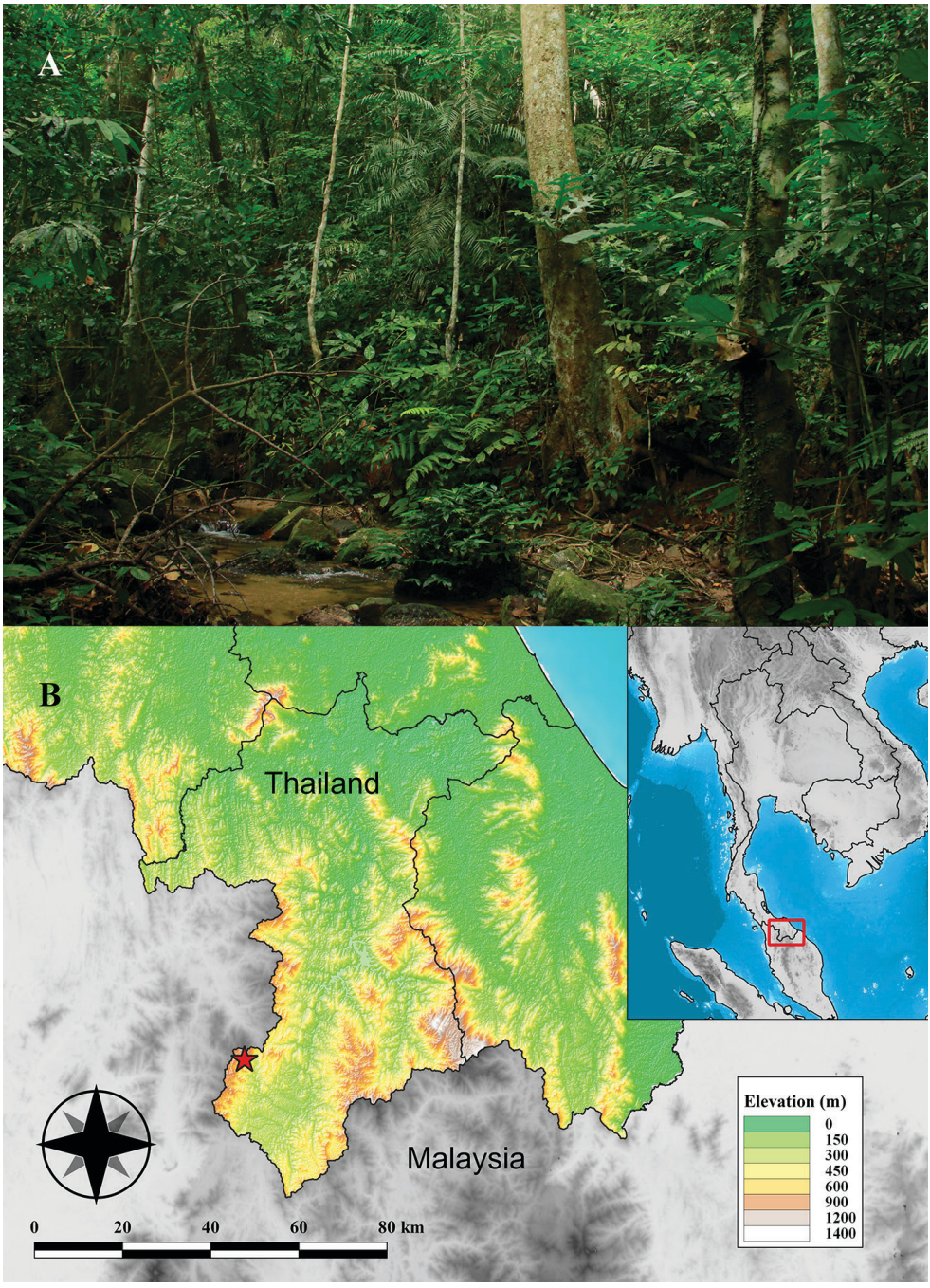

Figure 2. Habitat and distribution map of *Pulchriphyllium giganteum* (Hausleithner, 1984). A, habitat in Yala Province. B, distribution map in Thailand.

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