

**Research article**

Calymperes pallidum Mitt. - An addition to the moss flora of India

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Abstract: Recent explorations carried out in the Sirumalai Hills of the Western Ghats of Tamil Nadu led to the discovery of *Calymperes pallidum*, which is a new record for India. A detailed description with a photographic plate, a distribution map, and a key to the *Calymperes* species of the Western Ghats are provided.

Keywords: Acrocarpous - Moss - Pantropical - Sirumalai Hills - Western Ghats.

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INTRODUCTION

Calymperes Sw. ex F. Weber is a genus of acrocarpous mosses with a pantropical distribution (Ellis 1989). Lal (2005) included 15 species whereas Dandotiya *et al.* (2011) included 18 species for India. However, there are only 10 valid species (Tropicos 2024) that occur in India. All 10 species occur in the Western Ghats (Ellis 1989, Daniels & Kariyappa 2019). While exploring the Sirumalai Hills in the Southern Western Ghats, a species of *Calymperes* was discovered, which was later identified as *Calymperes pallidum* Mitt. This being the first record of this species in India, a description with a photographic plate and a distribution map are provided. A key to the indigenous species of *Calymperes* is also provided to distinguish *C. pallidum* from the rest of the indigens.

MATERIALS AND METHODS

Explorations were carried out during the past couple of years, particularly when the monsoons were active. The collected specimens were dissected under an Olympus SZ51 binocular stereomicroscope, and photographs of taxonomic importance were taken using an Olympus BX43 compound research microscope for a critical study. Identifications were made following monographs, recent publications, and consulting overseas experts. After the study, specimens were dried following traditional methods, enclosed in brown-paper covers of dimension 15×10 cm, labelled and deposited in the herbarium of Scott Christian College (SCCN).

RESULT

Species description

Calymperes pallidum Mitt., Philos. Trans. 168: 388. 1879; L.T. Ellis, J. Bryol. 15: 233. 1988 & 29: 261. 2007; O'Shea, Trop. Bryol. Res. Rep. 6: 42. 2006. – Type: Mauritius Is., Rodrigues, *Balfour s.n.* (BM); lectotype designated by L.T. Ellis (1998). (For a detailed synonymy please refer to O'Shea, 2006). **[Fig. 1]**

Plants caespitose, erect, 0.4–1.0 cm tall, pale green. Stems 0.18–0.20 × 0.20–0.24 mm in cross section, ovate, without a central strand; cortex 1- or 2-layered; cells 4–12 × 3–6 μm, thick-walled; medullary cells 10–24 × 8–14 μm, thick-walled. Leaves imbricate, erect to spreading, curled when dry, 1.8–2.4 × 0.5–0.8 mm, serrulate at margin, dimorphic; non-gemmiferous leaves ovate-lingulate, acute at apex with costa ending just below apex; gemmiferous leaves lingulate, with costa extending into a proboscis at apex; apical cells 6–18 × 4–12 μm, incrassate, rounded-hexagonal to quadrate-hexagonal, unipapillate; median cells 8–30 × 6–24 μm,

rounded-hexagonal to quadrate-hexagonal, unipapillate; cancellinae cells 5–8-rowed, on either side of costa, $18\text{--}40 \times 3\text{--}10 \mu\text{m}$, quadrate-hexagonal to elongate-hexagonal, thin-walled, hyaline; marginal cells at base form one row of elongate-rectangular toothed hyaline cells bordering the cancellina; tenioli 2-rowed, sub-marginal, extending to a little below apex; costa percurrent to excurrent, papillose on both surfaces, without stereid bands. Axillary hair filamentous, 4–7-celled, $70\text{--}130 \times 7\text{--}10 \mu\text{m}$. Gemmae $55\text{--}110 \times 18\text{--}30 \mu\text{m}$ clustered at costal apex, fusiform to clavate, pale reddish-brown. Sporophyte not seen.

Habitat: Corticolous on *Elaeocarpus tuberculatus* Roxb. (Elaeocarpaceae), a tree in degraded evergreen forests, ca. 1100 m.

Distribution: Africa, America, Caribbean Isl., Comoros Isl., La Réunion Is., Madagascar, Mauritius Is., Mayotte Is., Seychelles and Asia: Brunei, China, Indonesia, Malaysia, Maldives, Singapore, Vietnam (Tropicos 2024, GBIF 2024) and India: Western Ghats of Tamil Nadu (Dindigul) (present study). **[Fig. 2]**

Specimens examined: Western Ghats: Tamil Nadu, Dindigul District, Sirumalai Hills Palapannaikaadu, $10^{\circ} 11' 24.0'' \text{ N}$, $77^{\circ} 59' 24.0'' \text{ E}$, ca. 1100 m, 27.02.2023, Z. H. Williams & A. E. D. Daniels 389.

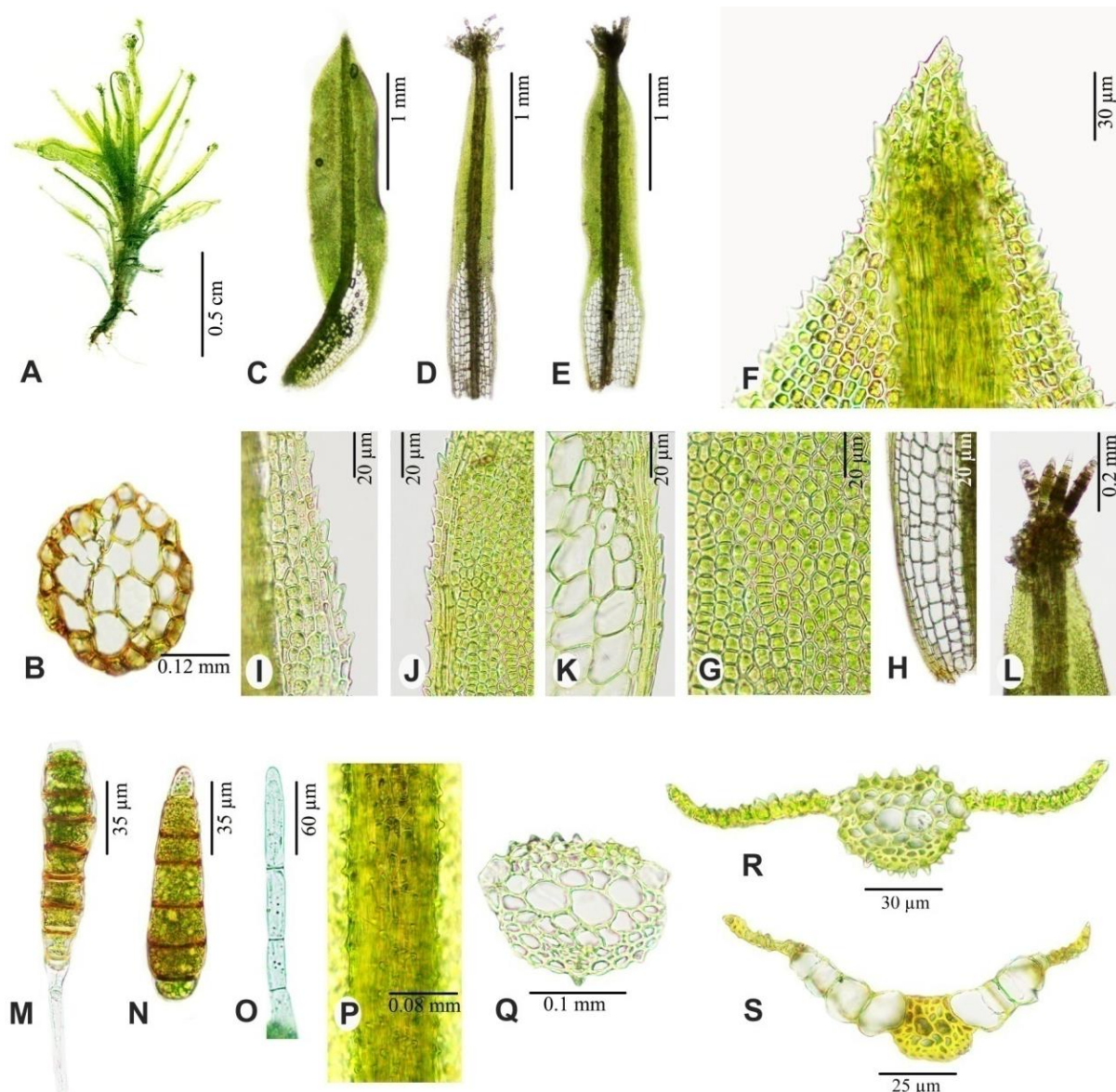


Figure 1. *Calymperes pallidum* Mitt.: **A**, Plant; **B**, Cross section of stem; **C**, Non-gemmiferous leaf; **D–E**, Gemmiferous leaves; **F**, Leaf apical cells; **G**, Leaf median cells; **H**, Leaf basal cells; **I**, Leaf marginal cells near apex; **J**, Leaf median cells at margin; **K**, Leaf marginal cells near base; **L**, Gemmae at leaf apex; **M–N**, Gemmae; **O**, Axillary hair; **P**, Adaxial surface of costa; **Q**, Cross section of costa showing absence of stereids; **R**, Cross section of leaf (at middle); **S**, Cross section of leaf (at base). [A. E. D. Daniels & Z. H. Williams 389]

Key to the species

- 1a. Stereid bands absent in costa ----- *C. pallidum*
- b. Stereid bands present in costa ----- 2
- 2a. Teniola present ----- 3
- b. Teniola absent ----- 10
- 3a. Teniola 2-rowed, extending a little above cancellinae ----- *C. tenerum*
- b. Teniola 3- or 4-rowed, sometimes 2 - or 1-rowed reaching apex or a little below apex ----- 4
- 4a. Teniola interrupted at shoulders of sheathing leaf-base by chlorophyllose lamina ----- 5
- b. Teniola not interrupted at shoulders of sheathing leaf-base by chlorophyllose lamina ----- 6
- 5a. Costa smooth ----- *C. palisotii*
- b. Costa rough ----- *C. mangaloreense*
- 6a. Leaf laminae cells 2-papillate; cancellinae cells 10–16-rowed ----- *C. erosum*
- b. Leaf laminae cells smooth or 1-papillate; cancellinae cells 7–13-rowed ----- 7
- 7a. Leaf marginal cells at base thin-walled and hyaline ----- *C. lonchophyllum*
- b. Leaf marginal cells at base neither thin-walled nor hyaline ----- 8
- 8a. Cancellinae cells 8–11-rowed; teniola 1-rowed at apex; ----- *C. afzelii*
- b. Cancellinae cells 9–13-rowed; teniola 2- or more-rowed at apex ----- 9
- 9a. Leaf margin entire above, faintly toothed below; teniola 2- or 3- rowed; cancellinae 9- or 10- rowed -----
- *C. moluccense*
- b. Leaf margin serrate throughout; teniola 3- or 4-rowed; cancellinae 9–13-rowed, pellucid ----- *C. taitense*
- 10a. Leaf margin flat; lamina cells mamillate; cancelline cells 7–9-rowed ----- *C. graeffeanum*
- b. Leaf margin inrolled; lamina cells papillate; cancelline cells 7-rowed ----- *C. motleyi*

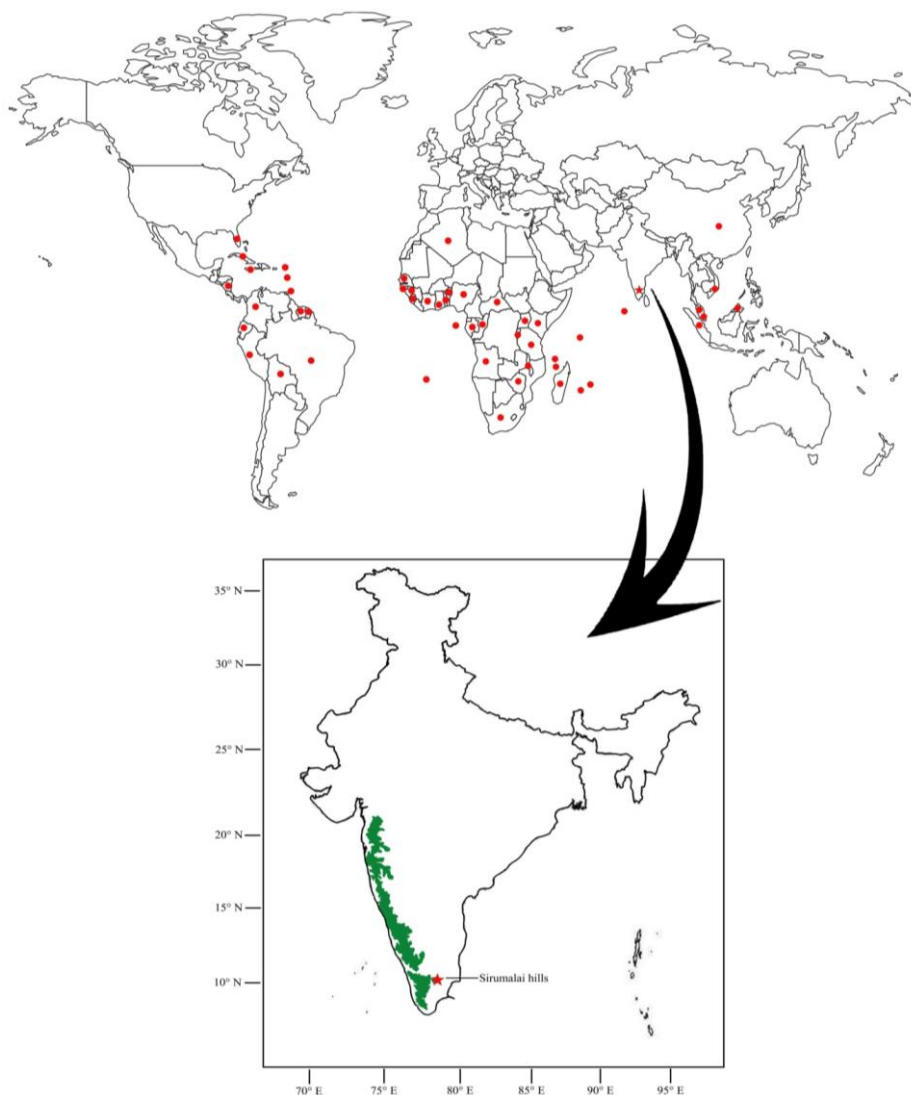


Figure 2. Worldwide distribution of *Calypteres pallidum* Mitt. [● Earlier records; ★ New record: India]

DISCUSSION

Calymperes pallidum can be readily distinguished from the rest of the species by the absence of stereid bands in the cross section of leaves, which is the unique distinguishing characteristic of this species.

In the study area, *Calymperes pallidum* was found to grow on the bark of *Elaeocarpus tuberculatus* Roxb. (Elaeocarpaceae), an Indo-Malayan evergreen tree species, in a riparian forest. Its occurrence in wet habitats in riparian forests indicates the need to conserve forests especially the sholas and evergreen forests. Any anthropogenic activity leading to the annihilation of shola and evergreen forests will lead to the extinction of this species locally and ultimately globally.

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