



RESEARCH ARTICLE

# *Tectaria polymorpha* (Wall. ex Hook.) Copel. (Tectariaceae), a new distributional record for Kerala

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## Abstract

*Tectaria polymorpha* (Wall. ex Hook.) Copel., is a rare species belongs to the family Tectariaceae. In southern India, so far it has been reported from Karnataka and Tamil Nadu States only. We report the occurrence of this species in Kerala State from Shendurney Wildlife Sanctuary, a part of Agasthyamala Biosphere Reserve. Taxonomic treatment with detailed description, specimens examined, ecology, distribution, note, key to the species of Kerala and photographs are provided here for its easy identification.

## Keywords

*Tectaria polymorpha*, new record, Kerala

## Introduction

*Tectaria* Cav. (Tectariaceae) is a large fern genus, well represented in tropical and subtropical regions with most species growing terrestrially in rainforests(1). The estimated number of species ranges from 150 (2, 3) to 210 (4, 5). Holttum recognized 105 species from Malesia and deduced that South East Asia as its centre of origin (5). Dixit (6) listed 21 species and one variety from India and this has been revised and amended to 22 species by Fraser-Jenkins (7). Raju Antony *et al.* then added one more species, *T. puberula* (Desv.) C. Chr. from Kerala, as a natural new extension of the distribution of an African species in Asia (8). Fraser-Jenkins raised the number of species to 28 species in his 'A modern list of Indian Pteridophytes' (9). The genus is dryopteroid in its morphology but has been placed in a separate family Tectariaceae based on molecular studies by Smith *et al.* (10). *Tectaria coadunata* (J. Sm.) C. Chr. (11–13, 16), *T. paradoxa* (Fee) Sledge (11–13, 16), *T. puberula* (Desv.) C. Chr. (8), *T. trimenii* C. Chr. (14), *T. wightii* (Clarke) Ching (11–13, 16) and *T. zeilanica* (Houtt.) Sledge (15) are the species so far reported from Kerala.

## Materials and Methods

The authors undertook an extensive Pteridophytic exploration in the Shendurney Wild Life Sanctuary, Kollam District, which is a part of the Agasthyamala Biosphere Reserve, a 'hot spot' region in the Western Ghats. Located between 77° 4' and 77° 17' E longitude and between 8° 48' and 8° 58' N Latitude, Shendurney Wild Life Sanctuary covers an area of 171 km<sup>2</sup>. The altitudes range from 200 to 1550 m. During the explorations, the senior and second authors collected interesting specimens of *Tectaria* Cav. from the

evergreen forest of the study area. The specimens collected were stored in sterile Polythene bags and brought to the lab and processed following Forman and Bridson (17). On critical study of the specimens with pertinent literature, it was identified as *Tectaria polymorpha* (Wall. ex Hook.) Copel. The identity was confirmed by Raju Antony, Pteridologist, Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Palode. The voucher specimens were deposited in the herbaria of the department of Botany, University of Kerala (KUBH) and Jawaharlal Nehru Tropical Botanic Garden and Research Institute (TBGT).



*Tectaria polymorpha* (A) Habit (B) Rhizome, (C) Frond, (D) Fertile lamina showing sori. (E) Sori of *Tectaria wightii*

## Results

The study of literature revealed that Beddome reported this species from Coonoor and Thirunelveli hills, which fall under the State of Tamil Nadu (15). Manickam and Iru-dayaraj (11) have reported only three species except this species in their 'Pteridophyte Flora of Western Ghats, South India'. Geevarghese and Nayar (12), Madhusoodanan (13) and Nair *et al.* (16) have not reported this species in their works "Fern flora of Malabar", "Handbook on ferns and fern-allies of Kerala" and Fern-allies and Ferns of Kerala" respectively. Patil *et al.* (18) erroneously reported this from Kerala without citing herbarium specimens and locality. Fraser-Jenkins *et al.* (19) have reported this species from Karnataka and Tamil Nadu for Southern India after the thorough reference of herbaria

and literature survey in their "An Annotated Checklist of Indian Pteridophytes Part II". After the literature survey and consultation of herbaria, it is confirmed that this species is not reported so far from Kerala and hence the present report is its extended distribution to Kerala State. Taxonomic treatment with detailed description, ecology, distribution, note, key to the species of *Tectaria* reported so far from Kerala State and photographs are provided here.

## Taxonomic Treatment

*Tectaria polymorpha* (Wall. ex Hook.) Copel. in Philipp. J. Sci., C. 2: 413. 1907; Hoitt., Kew Bull. 27(3): 419. 1972; Dixit, Census 144. 1984; Kuo, Taiwania 30: 29. 1985; Dixit, Indian Fern J. 6: 158. 1989; Rajagopal & Bhat, Indian Fern J. 15: 21. 1998; Fraser-Jenkins, Taxon. Revis. Indian Subcontinental Pteridophytes 314–315. 2008; Fraser-Jenkins *et al.*, Annot. Checkl. Ind. Pterid. II. 379–380. 2018; Patil *et al.*, Pl. Sci. Today, 6(2): 170–182. 2019. *Aspidium polymorphum* Wall. ex Hook., Sp. Fil. 4: 54. 1862. *Dryopteris polymorpha* (Wall. ex Hook.) Kuntze, Revis. Gen. Pl. 2: 813. 1891. *Nephrodium polymorphum* (Wall. ex Hook.) Baker, in Hooker & Baker, Syn. Fil. 297. 1867. *Tectaria khonsaensis* Sarn. Singh & Panigrahi, Ferns and Fern-Allies Arunachal Pradesh 2: 646. 2005.

Plants terrestrial, medium-large herbs, 34 – 53 cm in height. Rhizome short, 1 – 2 cm in diameter, sub-erect-short creeping, stout, densely scaly; scales 4 – 6 mm long, 1 – 2 mm broad, linear to lanceolate, concolorous, pale brown, glossy, apex long acuminate, base broad, round, margins entire, wavy. Fronds 32– 52 cm long, 11 – 18 cm broad, simple pinnate, clustered, sub-dimorphic; sterile fronds 32 – 50 cm long, 11 – 17.5 cm broad, shorter than fertile one; stipe 19 – 26 long, scaly at base only, dark brown, grooved, glabrescent; lamina simple, imparipinnate, dark green or brown when dried, ovate or deltoid to oblong, sparsely hairy on rachis, costa and veins; hairs ctenitoid type, reddish, articulate, also present along the margin; pinnae 11 – 15 cm long, 4 – 6 cm broad, 2 – 3 per frond, ovate-oblong or ovate-lanceolate, upper pinnae sessile, lower pinnae petiolate, apex acute-acuminate, margin entire or undulate (rarely segmented), bases round, lower pinnae bipartite; venation reticulate, raised on both sides, veinlets forming conspicuous sub-hexagonal areoles with included branched veinlets; fertile fronds 50 – 52 cm long, 16 – 18 cm broad, longer but narrower than sterile one; stipe 20 – 25 cm long, scaly at base, dark brown, grooved, glabrescent; lamina, ovate-lanceolate, sparsely hairy, rachis costa and costule; pinnae 10 – 12 cm long, 3.5 – 5 cm broad, 2 – 3 per frond, ovate-lanceolate, upper pinnae sessile, lower pinnae petiolate (short), apex long acute-acuminate, margin entire or undulate, lower pinnae bipartite; sori indusiate, orbicular, on veinlets or anastomosing veins, in 2 rows along the lateral veins or in irregular rows between lateral veins; indusia greenish white when young, brown at maturity, reniform, thin, membranous, entire; spores monoletic.

## Specimens examined

South India, Kerala, Kollam Dist., Shendurney, Pan-

dimotta, 18. 02. 2021, Reshma, 10458 (KUBH); *ibid* 04. 03. 2021, Jithin Raj, 96823(TBGT).

### Ecology

Very rare. Growing on earth banks in evergreen forest from 700 to 800 m alt.

### Distribution

India (Arunachal Pradesh, Assam State, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal), Bangladesh, Bhutan, Cambodia, China, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam.

### Note

*Tectaria polymorpha* has close resemblance with *Tectaria wightii*. It can be easily distinguished from the latter by having sub-erect rhizome, sub-dimorphic fronds with indusiate sori against long creeping rhizome and dimorphic fronds with ex-indusiate sori.

### Key to the species of *Tectaria* in Kerala

- 1a. Fronds simply pinnate
  - 2a. Rhizome sub-erect; fronds sub-dimorphic.....  
..... *T. polymorpha*
  - 2b. Rhizome long creeping; fronds dimorphic.....  
..... *T. wightii*
- 1b. Fronds pinnatifid, bipinnatifid or bipinnate
  - 3a. Veins not anastomosing..... *T. paradoxa*
  - 3b. Veins anastomosing
    - 4a. Fronds dimorphic..... *T. zeilanica*
    - 4b. Fronds unimorphic
      - 5a. Areoles without included veinlets. ....  
..... *T. trimenii*
      - 5b. Areoles with included veinlets
        - 6a. Rhizome long creeping; twin sori present..... *T. puberula*
        - 6b. Rhizome short creeping; twin sori absent..... *T. coadunata*

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### Authors contributions

RR and JRMP collected the specimens from the field, studied the materials and prepared draft of the manuscript. AGP corrected the manuscript. RR incorporated all the corrections. All the authors approved the final manuscript.

### Compliance with ethical standards

**Conflict of interest:** The authors have no conflict of interests.

**Ethical issues:** None.

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