



RESEARCH COMMUNICATION

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

Reshma Raju¹, Jithin Raj M P² & Gangaprasad A^{1,3*}

¹Department of Botany, University of Kerala, Kariavattom, Thiruvananthapuram, Kerala 695 581, India

²Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala 695 562, India

³Centre for Biodiversity, University of Kerala, Kariavattom, Thiruvananthapuram, Kerala 695 581, India

*Email: agangaprasad@yahoo.com



ARTICLE HISTORY

Received: 25 March 2022

Accepted: 11 June 2022

Available online

Version 1.0 : 09 November 2022

Version 2.0 : 01 January 2023



Additional information

Peer review: Publisher thanks Sectional Editor and the other anonymous reviewers for their contribution to the peer review of this work.

Reprints & permissions information is available at https://horizonepublishing.com/journals/index.php/PST/open_access_policy

Publisher's Note: Horizon e-Publishing Group remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Indexing: Plant Science Today, published by Horizon e-Publishing Group, is covered by Scopus, Web of Science, BIOSIS Previews, Clarivate Analytics, NAAS etc. See https://horizonepublishing.com/journals/index.php/PST/indexing_abstracting

Copyright: © The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited (<https://creativecommons.org/licenses/by/4.0/>)

CITE THIS ARTICLE

Raju R, Raj J M P, Gangaprasad A. *Tectaria polymorpha* (Wall. ex Hook.) Copel. (Tectariaceae), a new distributional record for Kerala. Plant Science Today. 2023; 10(1): 45–47. <https://doi.org/10.14719/pst.1747>

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 km². 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 (Fig. 1). 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).



Fig. 1. *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 monolete.

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*

Acknowledgements

The senior author is deeply indebted to the University Grant Commission (UGC) for financial assistance in the form of Junior Research Fellowship. The second author is thankful to the Director, Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI), Palode, Thiruvananthapuram for facilities provided for the study. The authors are also thankful to the Kerala Forest Department for necessary forest permission to collect specimens from Shendurney Wildlife Sanctuary.

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.

References

1. Ding HH, Chao YS, Dong SY. Taxonomic novelties in the fern genus *Tectaria* (Tectariaceae). *Phytotaxa*. 2013;122:61-64. <https://doi.org/10.11646/phytotaxa.122.1.3>
2. Tryon RM, Tryon AF. Ferns and Allied Plants, with Special Reference to Tropical America 1982; Springer Verlag, Berlin, Heidelberg, New York. <https://doi.org/10.1007/978-1-4613-8162-4>
3. Kramer KU. Dryopteridaceae. In: Kubitzki, K. (Editor.). The Families and Genera of Vascular Plants I. Pteridophytes and Gymnosperms. 1990; 101-44. Springer Verlag, Berlin, Heidelberg.
4. Holttum RE. Studies in the Fern Genera Allied to *Tectaria* Cav. 7. Species of *Tectaria* sect. *Sagenia* (Presl) Holttum in Asia excluding Malesia. *Kew Bull.* 1988; 43(3):475-89. <https://doi.org/10.2307/4118979>
5. Holttum RE. *Tectaria* group, in Flora Malesiana, ser. 2, Pteridophyta 1991; 2(1): 1-132. Rijksherbarium/HortusBotanicus, Leiden.
6. Dixit RD. A census of the Indian Pteridophytes, Flora of India, ser. 5. 1984; pp. 177. Botanical Survey of India, Howrah.
7. Fraser-Jenkins CR. Taxonomic Revision of Three Hundred Indian Sub continental Pteridophytes with a Revised Census-List. 2008; pp. 685. Bishen Singh Mahendra Pal Singh, Dehra Dun.
8. Raju Antony, Fraser-Jenkins CR, Mohanan N, Koshy CP. 2014. *Tectaria puberula* (Desv) C. Chr. (Dryopteridaceae: Pteridophyta), a new record for Asia. *Indian Fern J.* 2014;31(1 & 2):139-42.
9. Fraser-Jenkins CR. A Modern Taxonomic List of Indian Pteridophytes. *Indian Fern J.* 2020;37 (1-2):129.
10. Smith AR, Pryer KM, Schuettpelz E, Korall P, Schneider H, Wolf PG. A classification for extant ferns. *Taxon.* 2006;55:705-31. <https://doi.org/10.2307/25065646>
11. Manickam VS, Irudayaraj V. Pteridophyte Flora W. Ghats. 1992;255-261. Today & Tomorrow Printers & Publishers, New Delhi.
12. Geevarghese KK, Nayar BK. Fern flora of Malabar.1992; 219-227. Indus Publishing Company, New Delhi.
13. Madhusoodanan PV. Handbook on ferns and fern-allies of Kerala. 2015. Malabar Botanic Garden and Institute for Plant Sciences, Kozhikkode.
14. Beddome RH. Handbook to the Ferns of British India, Ceylon and the Malay Peninsula. 1883; pp. 501. Thacker Spink & Co. Calcutta. <https://doi.org/10.5962/bhl.title.101756>
15. Beddome RH. The Ferns of Southern India. 1864. Gant Bros. Madras.
16. Nair NC, Ghosh SR, Bhargavan P. Fern-Allies and Ferns of Kerala-Part III. *J Econ Tax Bot.* 1992; 16(3): 514-15.
17. Forman L, Bridson D. The Herbarium Handbook 1989. Royal Botanic Gardens, Kew.
18. Patil SM, Raju Antony, Nampy S, Rajput KS. Diversity, distribution and conservation status of genus *Tectaria* Cav. from Deccan Peninsula and Western Ghats of India. *Not Sci Biol.* 2019;11(3):475-80. <https://doi.org/10.15835/nsb11310486>
19. Fraser-Jenkins CR, Gandhi KN, Kholia BS. An Annotated Checklist of Indian Pteridophytes Part-II (Woodsiaceae to Dryopteridaceae). 2018;379-80. Bishen Singh Mahendra Pal Singh, Dehradun.

§§§