



Plant Science Research

ISSN 0972-8546



Lygodium flexuosum (L.) Sw. (Lygodiaceae): A new record for Eastern Ghats of Tamil Nadu, India

R. Kottaimuthu^{1Ψ}, S. Selvakumar², C. Kalidass³ & M. Jothi Basu⁴¹ Department of Botany, Alagappa University, Karaikudi-630 003, India,² Department of Botany, Saraswathi Narayanan College, Madurai-625 022, India,³ Taxonomy & Conservation Division, Regional Plant Resource Centre, Bhubaneswar-751 015, India,⁴ Department of Botany (DDE), Alagappa University, Karaikudi, India

ARTICLE INFO

Article history:

Received : 18 November, 2020

Revised : 1 December, 2020

Accepted : 18 December, 2020

Keywords:

Alagar Hills
Distribution
Eastern Ghats
Fern

ABSTRACT

The climbing fern *Lygodium flexuosum* (L.) Sw. is reported for the first time from the Eastern Ghats of Tamil Nadu. A brief description, photograph and pertinent notes are furnished for easy identification.

© 2020 Orissa Botanical Society

The climbing fern genus *Lygodium* was established by Swartz (1801) and it can easily be noted in the field by its scandent, long, vine-like leaves and finger-like fertile marginal lobes (Mueller, 1982; Singh & Panigrahi, 1984). It comprises about 29 species (POWO 2020), mostly distributed in the tropics, subtropics, and in eastern USA (Duek, 1978). In India, so far nine species have been reported (Fraser-Jenkins *et al.*, 2016), among them Eastern Ghats is represented by three species: *Lygodium altum* (C.B. Clarke) Alderw., *L. flexuosum* (L.) Sw. and *L. microphyllum* (Cav.) R.Br. (Mandal *et al.*, 2020). Studies by Pemberton & Ferriter (1998), Lott *et al.* (2003) and Volin *et al.* (2004) proved that several species of *Lygodium* are problematic invasive species in many countries.

In Tamil Nadu, the Eastern Ghats start from the Jawadi Hills and extend up to the Alagar Hills (Ramachandran *et al.*, 2016). The Jawadi, Elagiri, Shevaroy, Chitteri, Kalrayan, Bodamalai, Kolli, Pachaimalai, Semmalai, Aiyalur, Karandamalai, Sirumalai, and Alagarmalai are the major hills, covering an area of 6024 km² (Jayakumar *et al.*, 2009). During 2013, the first author has collected *Lygodium flexuosum*

from the riparian fringes of Karandamali, Eastern Ghats, Tamil Nadu. Thereafter the images were sent to Fraser-Jenkins and he confirmed our identification. Recently, we came across an article entitled 'A census of pteridophytes of Eastern Ghats, India' by Mandal *et al.* (2020) in which the species was reported only from the Eastern Ghats of Odisha and Andhra Pradesh but not from the Tamil Nadu. Hence we scrutinized the literature with reference to distribution of this fern and we found that the species shows wider distribution range in India (Fraser-Jenkins 2008; Fraser-Jenkins *et al.*, 2016) and in Tamil Nadu it is hitherto reported only from the hill ranges of Western Ghats (Manickam & Irudayaraj, 1992, 2003; Benniamin & Sundari, 2020). Furthermore it was not reported from any of the hill ranges in Eastern Ghats of Tamil Nadu (Subramanyam *et al.*, 1960; Dwarakan & Ansari 1998; Karuppusamy *et al.*, 2001; Manickam *et al.*, 2004; Moorthy *et al.*, 2012; Sundari *et al.*, 2012; Kumaraguru *et al.*, 2015; Kavitha *et al.*, 2017; Sureshkumar *et al.*, 2020). Hence it is being reported here as a new distributional record for Lygodiaceae of Eastern Ghats of Tamil Nadu.

Ψ Corresponding author; Email: kottaimuthu@yahoo.co.in

Lygodium flexuosum (L.) Sw. in J. Bot. (Schrader) 1800(2): 106. 1801; Manickam & Irudayaraj, Pterid. Fl. West. Ghats, S. India: 238. 1992; Manickam & Irudayaraj, Pterid. Fl. Nilgiris: 77. 2003; Fraser-Jenk. *et al.*, Annot. Checkl. Ind. Pterid. 1: 107. 2016. *Ophioglossum flexuosum* L., Sp. Pl. 1063. 1753. *Lygodium semibipinnatum* R. Br. Prod. Fl. Nov. Holl.: 162. 1810. *Lygodium pinnatifidum* Sw. in Schrad. J. Bot. 1801(2): 303. 1803. *Lygodium serrulatum* Bl., Enum. Pl. Jav. 254. 1828. (Fig.1)

Rhizome creeping covered by dark brown, multi cellular, uniseriate hairs. Stipe up to 50 cm long, glabrous adaxially flat, abaxially round. Young fronds palmate, oblong, lanceolate, about 2-4 m tall and 35 cm wide tripinnate, primary pinnae alternate about 10 cm apart with about 3 mm long, common stalk forked once, each forked branch bears three pairs of simple or forked pinnules; pinnules up to 7 x 1 cm, oblong, lanceolate, veins simple or forked, forked twice or thrice, free, reaching the margin, pinnae light green, texture coriaceous. Sporangia arranged in finger-like spike along the margin of the pinnules. Sporangia 0.3 mm in size, horizontal with terminal annulus, short stalked up to eight pairs, arranged in two alternate rows. Spores trilete, 25 x 30 m in size, exine verrucate.

Specimens examined: INDIA. Tamil Nadu, Dindigul District, Karandamalai, Peria aruvi valley, 430 m,

R.Kottaimuthu 20102; same place, 25 December 2019, *R.Kottaimuthu 21309* (Alagappa University Herbarium!).

Global Distribution: India (Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh & West Bengal), Africa, Australia, Bangladesh, China, Japan, Malaysian Islands, Pacific Islands, Philippines Sri Lanka, Taiwan, Thailand and Vietnam.

Distribution in Eastern Ghats: Gandhamardan Hills (Mishra *et al.*, 2001), Rampa Hills (Singh & Panigrahi, 1984), Nallamalai (Ellis, 1990) and Karandamalai (present report).

Medicinal Uses: With the help of literature survey, we found that *L. flexuosum* is one of the potential medicinal ferns widely used by the indigenous people of India for various primary healthcares. The whole plant is used as expectorant; rhizome boiled with mustard oil and locally applied to carbuncles and in rheumatism, sprains, scabies, wounds and ulcers (Dixit, 1959; Singh & Viswanathan, 1996). Rhizome is also used as abortifacient and as appetizer. It is also used in the treatment of abdominal pain, cholera and jaundice (Girach & Aminuddin 1989; Ramesh *et al.*, 2003), fever, female infertility and gonorrhoea (Rout *et al.*, 2009).



Fig.1. A twig of *Lygodium flexuosum* (L.) Sw.

Acknowledgements

Authors (MJ & RK) extend their sincere thanks to the MHRD-RUSA 2.0 [F.24/51/2014-U], Policy (TNMulti-Gen), Dept. of Edn. Govt. of India, for the financial assistance. Special thanks to Dr. C.R.Fraser-Jenkins for his valuable comments on its identification.

References

- Dixit, R.D. (1959). Medicinal ferns of India: *Bull. Natn. Bot. Gard.* 29: 1–36.
- Duek, J.J. (1978). A taxonomic revision of *Lygodium* (Filicinae) in America. *Fedd. Repert.* 89: 411–423.
- Ellis, J.L. (1990). *Flora of Nallamalais*. Vol. 2. Botanical Survey of India, Calcutta.
- Fraser-Jenkins, C.R. (2008). Taxonomic Revision of Three Hundred Indian subcontinental Pteridophytes with a revised census-list (A new picture of fern-taxonomy and nomenclature in the Indian subcontinent). Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Fraser-Jenkins, C.R., Gandhi, K.N., Kholia, B.S. and Benniamin, A. (2016). An Annotated Checklist of Indian Pteridophytes, Part - 1 (Lycopodiaceae to Thelypteridaceae). Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Girach, R.D. and Aminuddin (1989). Ethnopteridological notes on *Lygodium flexuosum* (Linn.) Sw. *J. Econ. Taxon. Bot.* 13(2): 255–257.
- Jayakumar, S., Ramachandran, A., Bhaskaran, G. and Heo, J. (2009). Forest dynamics in the Eastern Ghats of Tamil Nadu, India. *Environ. Manag.* 43: 326–345.
- Karupphasamy, N., Karmegam, N. and Rajasekaran, K.M. (2001). Enumeration, ecology and ethnobotany of ferns of Sirumalai Hills, South India. *J. Econ. Taxon. Bot.* 25: 631–634.
- Kavitha T., Nandhakumar, K. and Moorthy, D. (2017). Survey of fern and fern allies from Sitheri Hills, Eastern Ghats, Tamil Nadu, India. *Int. J. Recent Sci. Res.* 8 (11): 21795–21796.
- Kumaraguru, A., Brinda, T., Balaguru, B., Soosairaj, S. and Britto, S.J. (2015). Vascular plant distribution in an endangered fragile ecosystem of Shervarayan Hills, Eastern Ghats of India. *Int. J. Recent Sci. Res.* 6(10): 7006–7012.
- Madhusoodanan, P.V. and A. Rejani (1994). Re-investigation on the present status of the ferns and fern allies of *Hortus Malabaricus*. *Indian Fern J.* 11: 12–19.
- Manickam, V.S. and Irudayaraj, V. (1992). Pteridophyte Flora of the Western Ghats - South India. B.I. Publications, New Delhi.
- Manickam, V.S. and Irudayaraj, V. (2003). Pteridophyte Flora of Nilgiris, South India. Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Mishra, R.C., Panda, P.C. and Das, P. 2001. A taxonomic study of the ferns and fern allies of Gandhamardan hills, Orissa. *J. Econ. Taxon. Bot.* 25(3): 577–590.
- Moorthy D., Paulsamy, S. and Nanda Kumar, K. (2012). Survey of ferns and fern allies from Shevaroyan hills, Eastern Ghats, Southern India. *J. Res. Cons. Biol.* 1(2): 64–68.
- Mueller, R.J. (1982). Shoot morphology of the climbing fern *Lygodium* (Schizaeaceae): general organography, leaf initiation, and branching. *Bot. Gaz.* 143: 319–330.
- POWO (2020). *Lygodium*. <http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:331112-2>. (Accessed on 1 November 2020).
- Pullaiah, T., Ahmed, A. and Lakshmi, A. (2003). Pteridophytes in Andhra Pradesh, India. Regency Publications, New Delhi.
- Lott, M.S., Volin, J.C., Pemberton, R.W. and Austin, D.F. (2003). The reproductive biology of the invasive ferns *Lygodium microphyllum* and *L. japonicum* (Schizaeaceae): Implications for invasive potential. *Ame. J. Bot.* 90: 1144–1152.
- Pemberton, R.W. and Ferriter, A.P. (1998). Old World climbing fern (*Lygodium microphyllum*), a dangerous invasive weed in Florida. *Ame. Fern J.* 88: 165–175.
- Ramachandran, A., Radhapriya, P., Jayakumar, S., Dhanya, P. and Geetha, R. (2016). Critical analysis of forest degradation in the Southern Eastern Ghats of India: Comparison of satellite imagery and soil quality index. *PLoS ONE* 11(1): e0147541. 1–19.
- Ramesh, M., Kumar, M. and Manilal, K.S. (2003). Medicinal Pteridophytes in Rheed's Hortus Malabaricus. *Indian Fern J.* 20: 51–59.
- Singh, H.B. and Viswanathan, M.V. (1996). Useful pteridophytes of India – A gift of nature for human beings. *J. Econ. Taxon. Bot. (Addl. Ser.)* 12: 24–36.
- Singh, S. and Panigrahi, G. (1984). Systematics of the genus *Lygodium* Sw. (Lygodiaceae) in India. *Proc. Indian Acad. Sci., Pl. Sci.* 93: 119–133.
- Subramanyam, K., Thothathri, K. and Henry, A.N. (1960). On a collection of ferns from Shevaroy Hills, Salem district, Madras state. *Bull. Bot. Surv. India* 2: 323–327.
- Sundari, S.M., Benniamin, A., Siva, N., Maridass, M. and Karthick, A. (2012). A preliminary survey of Pteridophytes from Alagar Hills, Madurai, Eastern Ghats. *Int. J. Applied Bioreserach* 6: 1–6.
- Sureshkumar, J., Ayyanar, M. and Silambarasan, R. (2020). Pteridophyte species richness along elevation gradients in Kolli Hills of the Eastern Ghats, India. *J. Asia-Pacific Biodivers.* 13: 92e106. 1–15.
- Swartz, O. (1801). *Genera et spr filicum ordinc systematico rcdactarum*; *J. Bot. (Schrad.)* 1800(2): 7, 106.
- Volin, J.C., Lott, M.S., Muss, J.D. and Owen, D. (2004). Predicting rapid invasion of the Florida Everglades by Old World climbing fern (*Lygodium microphyllum*). *Divers. Distrib.* 10: 439–446.