J. Biodivers. Conservation 8(4): 114-119 ISSN: 2457-0761 (online)
2024 http://www.aprfjournal.in

Review Paper

Exploring the multifaceted potential of *Lygodium flexuosum*: morphology, distribution, medicinal, ecological, and pharmacological aspects

Amaryllis Langbang[1], Kadambini Das[2], Sohan Lal[3], Jyoti Chauhan[4], Rohini Lama[5], Gian Chand[6] and Bhagwati Prashad Sharma[7]*

[1]Assam Don Bosco university Tapesia Gardens, Kamarkuchi Sonapur, Assam, India

[2]University Department of Botany, Babasaheb Bhimrao Ambedkar Bihar University, Muzaffarpur, Bihar, India

[3]School of studies in Botany, Shaheed Mahendra Karma Vishvavidyalay, Bastar, Jagdalpur, Chhattisgarh, India

[4]Department of Botany, Institute of Integrated and Honors Studies, Kurukshetra University Kurukshetra, Haryana, India

[5]P.G and U.G Department of Botany, Darjeeling Government College, Darjeeling, West-Bengal, India

[6]Department of Botany, Government College, Kullu, Himachal Pradesh, India

[7]Department of Botany, Sidharth Government College Nadaun, Himachal Pradesh, India

*Email-Id: bp76sharma@gmail.com; ORCID: https://orcid.org/0000-0002-8134-9807

Article Details: Received: 2024-09-19 | Accepted: 2024-10-16 | Available online: 2024-10-21

Abstract: *Lygodium flexuosum*, a tropical fern species, has garnered significant attention for its diverse potential. This review aims to consolidate existing knowledge on its morphology, distribution, medicinal, ecological, and pharmacological aspects, highlighting its significance and future research directions.

Keywords: Fern, *Lygodium*, aquatic, unexplored

Introduction

Lygodium flexuosum, a species of fern, has garnered significant attention for its medicinal, ecological, and pharmacological potential. Native to tropical and sub-tropical regions, this plant has been used in traditional medicine for centuries. It belongs to the family Schizaeaceae. The plant is characterized by its delicate, flexuous (wavy) fronds. Fronds are lanceolate to ovate-lanceolate. Its size and shape show morphological variations as per landscapes and environmental conditions (Figures 1-2).

Figure 1: Leaves of *Lygodium flexuosum*

Figure 2: Development of sori in *Lygodium flexuosum*

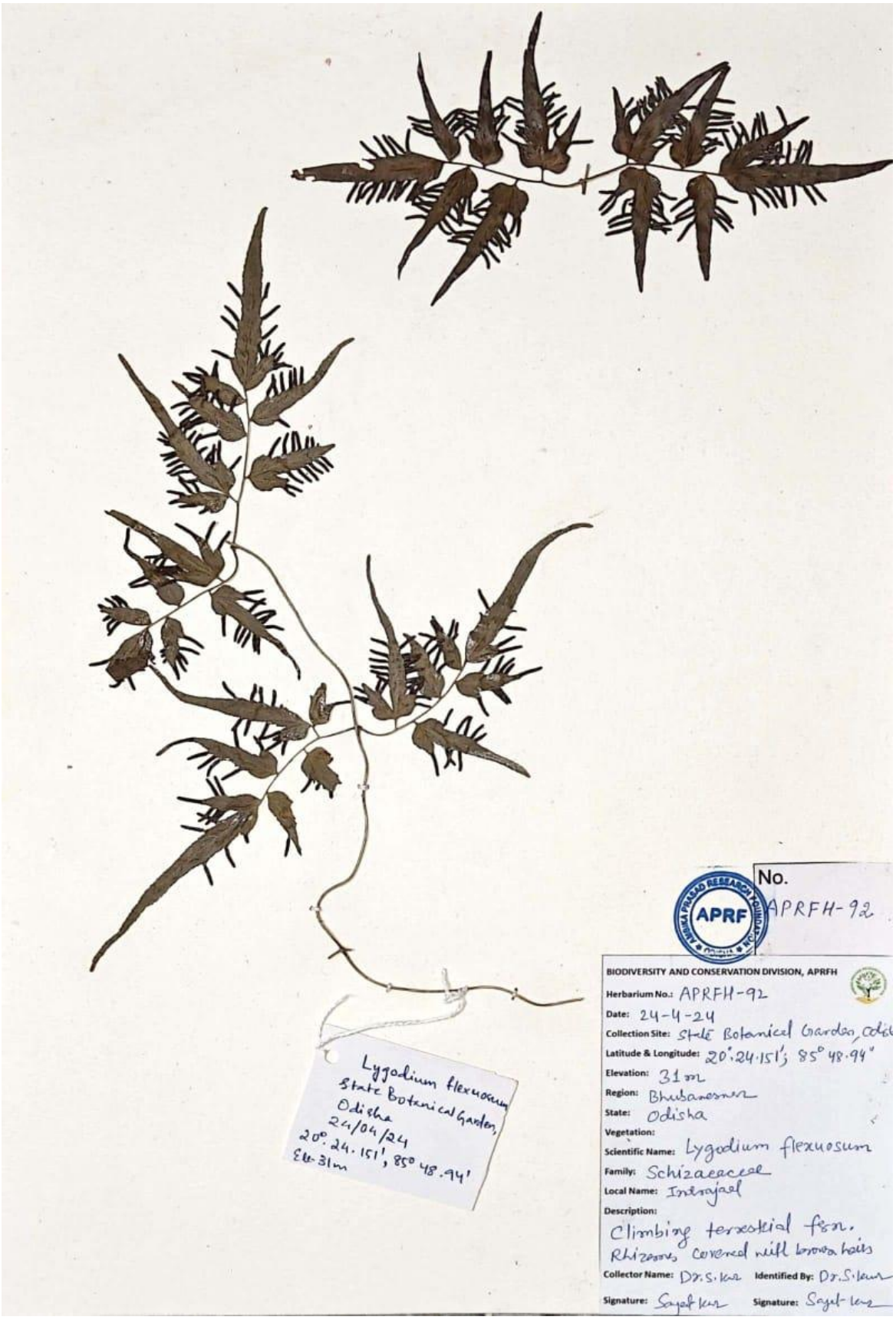

Figure 3: Herbarium specimen of *Lygodium flexuosum* (Source: Herbarium unit of APRFH)

Basel leaflets are lobed and largest leaflets are hairy and winged. Rachis and petiole rarely thicker and several feet long, the rachis bearing short primary branches ending in a tuft of hairs, each primary branch bearing a pair of secondary branches which in their turn bear 3-4 alternately arranged pinnules and a simple or forked terminal pinnule. Stolons are long, slender, creeping and length & thickness vary with age and habitat. Rhizomes are short, compact, bearing adventitious roots, slender, wiry, creeping, underground, dichotomously branched, young regions clothed by stiff brown hairs and producing a single row of climbing leaves. Sori are small, rounded, borne on the underside of fronds (Yadav et al., 2012). It shows the terrestrial climbing habit and usually grow near water, open places, in moist areas, inside forest and near streams. It is distributed in China, India, Sri Lanka, Indonesia, Thailand, Malaysia, Papua New Guinea, Queensland, and Western Australia (Yadav et al., 2012). In India, it is distributed in Himachal Pradesh, Uttarakhand, Maharashtra, Goa, Karnataka, Kerala, Andhra Pradesh, Odisha, West Bengal, Sikkim, Assam, Arunachal Pradesh, Tripura, and, Andaman & Nicobar.

Figure 4: *L. flexuosum* collected from Hamirpur, Himachal Pradesh, India

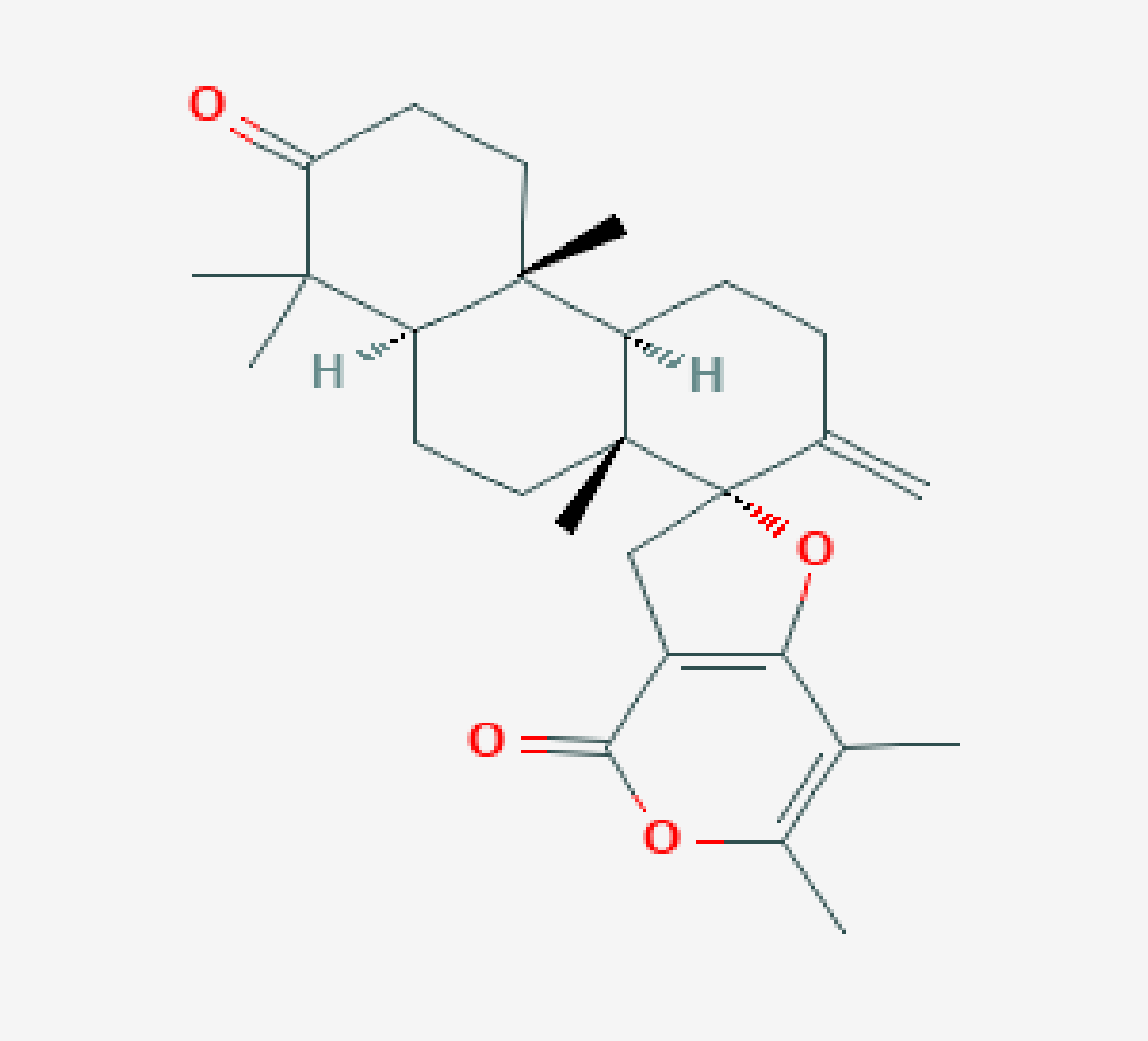

Figure 5: Chemical structure of Lygodinolide (Source: PubChem)

Medicinal Potential

It is widely used in treating various ailments like jaundice, dysmenorrhea, wound healing, and eczema (Yadav et al., 2012). Root paste is mixed with mustard oil and used to cure scabies and eczema. Ash of whole plant is used to treat herpes. The paste of whole plant is used to reduce inflammation (Singh et al., 2005; Wills and Asha, 2006; Manhas et al., 2009; Yadav et al., 2012). The leaf decoction is diuretic and used to treat urinary tract infections in Himachal Pradesh, India (Present study).

Pharmacological Potential:

L. flexuosum (Figure 3-4) has pharmacological potential and reported by many researchers. Chemo preventive action of *L. flexuosum* extract in human hepatoma PLC/PRF/5 and Hep 3B cells are reported (Wills and Asha, 2009). Protective effect of *L. flexuosum* against excision, incision and dead space wounds models in experimental rats are also reported (Chandra et al., 2015). *L. flexuosum* has been reported to possess antimicrobial, antioxidant, and anti-inflammatory properties, making it a potential

treatment for various diseases. The plant's extracts have also shown promise in inhibiting cancer cell growth and exhibiting hepatoprotective effects (Yadav et al., 2012).

Bioactive compounds

It is a rich source of alkaloids, flavonoids, saponins, and cumarin. The main constituent of the plant is lygodinolide, which is mainly used in wound healing (Yadav et al., 2012). A new triterpene ester, an anthraquinone, has been found in this plant. Lygodinolide was isolated from the methanolic extract of *L. flexuosum* (Figure 5). Other isolated bioactive compounds are O-P-coumaryl dryocrassol, tectoquinone, kaempferol, kaempferol-3-β-D-glucoside, β-sitosterol, and stigmasterol (Yadav et al., 2012).

Ecological Potential

As an epiphytic fern, *L. flexuosum* plays a crucial role in maintaining forest ecosystem balance. It provides habitat for various insects and microorganisms and contributes to nutrient cycling (Present study).

Conclusion

Lygodium flexuosum demonstrates significant medicinal, ecological, and pharmacological potential. Further research is necessary to fully explore its benefits and applications.

References

Chandra P, Yadav E, Mani M, Ghosh AK and Sachan N. (2015). Protective effect of *Lygodium flexuosum* (family: Lygodiaceae) against excision, incision, and dead space wounds models in experimental rats. Toxicology and Industrial Health. 31(3): 274–280.

Manhas RK, Mukesh GK, Deepa K. (2009). Plant diversity of a fresh water swamps of Doon valley, India. Journal Am Sci. 5:1–7.

Singh S, Dixit RD, Sahu TR. (2005). Ethanomedical uses of petridophytes of Amarkantak, Madhya Pradesh. Journal of Indian Traditional Knowledge. 4:392–5.

Wills PJ and Asha VV. (2009). Chemopreventive action of *Lygodium flexuosum* extract in human hepatoma PLC/PRF/5 and Hep 3B cells. Journal of Ethnopharmacology. 122(2): 294–303.

Wills PJ, Asha VV. (2006). Protective effect of *Lygodium flexuosum* (L.) Sw. (Lygodiaceae) against D-galactosamine induced liver injury in rats. Journal of Ethnopharmacology. 108:116–23.

Yadav E, Mani M, Chandra P, Sachan N and Ghosh AK. (2012). A review on therapeutic potential of *Lygodium flexuosum* Linn. Pharmacognosy Reviews. *6*(12): 107–114.