

Checklist of Pteridophytes from Howrah district, West Bengal : An Ethnobotanical and conservational overview with some new species added

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Abstract

Pteridophytes are the first land vascular plants conquering the earth terrestrial surface mainly in the tropical region of earth for many years. West Bengal is one of the diverse states of India with unique geographical distribution that does not present in any other states of India. The Lower Gangetic plain part of West Bengal contains few districts among which Howrah is also a renowned one. This district is very urbanized but still few area are giving shelter to diverse group of plants like pteridophytes. Here I found 21 species of pteridophytes belong to 14 genera and 9 families.

Among which three taxa like *Thelypteris lebeufii*, *Thelypteris interrupta* and *Selaginella vaginata* were newly added in the checklist. All the taxa had some ethno-medicinal importance used in various regions by native people. Though all the pteridophytes found here were under 'Least Concerned' category under IUCN but few of the pteridophytes are rare in some undisturbed area if not cared properly then those pteridophytes will go extinct soon locally. Moreover, many of the pteridophytes can be used as ecological indicator in many areas.

Keywords : Pteridophytes, Ethnobotany, Conservation.

Introduction

Pteridophytes also known as the vascular cryptogams have originated almost 430 million years ago. From then the plants are flourishing in diverse part of land and different habitats securing the 2nd most diverse group of plant in the world. India is one of the mega-diversity countries of earth and contains thousands of vascular plants with huge diversity having 4 hotspots with numerous endemic and rare species. West Bengal is among the diversity rich states of India having unique type of geographical pattern having both Himalaya and ocean in its distribution. The Lower Gangetic plain covers the south part of this state and contains majority of the districts of West Bengal (Singh et al, 1998). Howrah district is one of the 23 districts.

Howrah district is one of the most urbanized districts of West Bengal having numerous small to large scale industries, crop lands and human settlement etc. It's land covers between 22°48' North and 22°12' North latitudes and between 88°23' East and 87°50' East longitudes, It is surrounded by Hooghly and Rupnarayan rivers and 4 districts like North 24 Parganas , South 24 Parganas, Hooghly, Kolkata, Purba Midnapore and Paschim Midnapore (https://wbindustries.gov.in/files/Mines/DSR/DSR_Howrah.pdf).

The climate is mainly represented by hot summer, moderate winter and high humidity in almost all the year with average annual rainfall of almost 1245.06 mm. and temperature ranging from 18- 28 °C. The riverside position leads to alluvial soil with diverse ratio of slit, sand and clay matter in soil.

Due to the geographical distribution, the district gives shelter to huge vegetation diversity. Pteridophytes are one of those. Though this group of plant are often studied improperly with many taxonomical lacunas. Hence, proper taxonomical studies are must needed. In Howrah district, the vegetation is presented by semi-natural or planted forest those face habitat destruction due to human causing issues. Hence, this affects the distribution of the pteridophytes those are important not only for the ecologically but also ethno-medicinally among the native people. Hence, conserving this lower group of vascular plants is must needed thing. So, the objective of the study was to do a proper taxonomical

identification of the taxa and then making a species richness list of individual taxa with proper identification along with reviewing the medicinal use of the individual taxa.

Analysis

In the study I explored the different locations of the two sub-divisions of Howrah district, i.e. The Howrah-Sadar sub-division and the Uluberia sub-division. Throughout the study I found total 21 species of pteridophytes belong to 14 genera and 9 families. The identification of individual taxa was done with the help of regional flora, manuals and herbarium. The IUCN status of majority of the species like *Adiantum caudatum*, *Adiantum philippense*, *Thelypteris prolifera*, *Thelypteris lebeufii*, *Drynaria quercifolia*, *Lygodium flexuosum*, *Lygodium japonicum*, *Marsilea minuta*, *Microsorium punctatum*, *Pteris multifida*, *Pyrrosia lanceolata*, *Selaginella vaginata*, *Stenochlaena palustris* were not mentioned yet in the <https://www.iucnredlist.org/> website. But the remaining 8 were shown as 'Least Concern'. I followed the classification system by PPG-I (2016) for grouping the taxa according to family. So many of the taxa are arranged in different family that differ from the work of Bandyopadhyay and Mukherjee (2014). The name of the taxa along with their ethno-medicinal values are given below –

Selaginellaceae

1. *Selaginella vaginata* Spring, Mém. Acad. Roy. Sci. Belgique 24: 87 (1850)**

** This plant was newly found in reported taxa list after the work of Bandyopadhyay and Mukherjee (2014)

Ethnomedicinal use - Plants are used against cut and wounds (Sureshkumar et al, 2018)

Salviniaceae

2. *Azolla pinnata* R.Br., Prodr. Fl. Nov. Holland. 167 (1810)

Ethnomedicinal use – Plants are used as Diuretic (Goswami et al, 2016; Sureshkumar et al, 2018)

3. *Salvinia natans* (L.) All., Fl. Pedem. 2: 289 (1785)

Ethnomedicinal use – Plants are used against ring worm, and ulcer (Sureshkumar et al, 2018; Goswami et al, 2016)

Marsiliaceae

4. *Marsilea minuta* L., Mant. 308 (1771)

Ethnomedicinal use – Plants are used against Epilepsy, cough, spastic conditions of leg muscles, sedation and insomnia (Goswami et al, 2016; Sabithira and Udayakumar, 2017)

Polypodiaceae

5. *Drynaria quercifolia* (L.) J.Sm., J. Bot. (Hooker) 3: 398 (1841)

Ethnomedicinal use – Plants are used against wound healing, lumbago treatment; The rhizome is used as astringent used against hectic fever and cough (Goswami et al, 2016; Kanimozhi et al, 2022)

6. *Microsorium punctatum* (L.) Copel., Univ. Calif. Publ. Bot. 16: 111 (1929)

Ethnomedicinal use – Leaves and extracted juice are used as purgative, diuretic and wound healer (Goswami et al, 2016; Amoroso, V.B., 2017)

7. *Pyrrosia lanceolata* (L.) Farw., Amer. Midl. Naturalist 12: 245 (1931)

Ethnomedicinal use – Plants are used against skin disorders, colds and sore throat (Goswami et al, 2016)

Lygodiaceae

8. *Lygodium flexuosum* (L.) Sw. in Schrad. J. Bot. 1800(2)

Ethnomedicinal use – Plant extract is used against spermatorrhoea, dysmenorrhoea, jaundice and skin disease; also used as expectorant; used for rheumatism, sprains, scabies, eczema and cut wounds (Goswami et al, 2016; Dubal and Kale, 2014)

9. *Lygodium japonicum* (Thunb.) Sw., J. Bot. (Schrader) 1800(2): 106 (1801)

Ethnomedicinal use – Plants used as expectorant (Goswami et al, 2016, Zhu et al, 2009)

Stenochlaenaceae

10. *Stenochlaena palustris* (Burm.f.) Bedd., Suppl. Ferns Brit. Ind. 26 (1876)

Ethnomedicinal use – Plants are used to cure fever (Goswami et al, 2016; Chai et al, 2012)

Woodsiaceae

11. *Diplazium esculentum* (Retz.) Sw., J. Bot. (Schrader) 1801(2): 312 (1803)

Ethnomedicinal use – Plants used against toothache. Leaves are used by pregnant women as protection against difficult child birth; also used as insect repellent. The decoction of plant is used for haemoptysis and cough (Goswami et al, 2016, Semwal et al, 2021).

Pteridaceae

12. *Ceratopteris thalictroides* (L.) Brongn., Bull. Sci. Soc. Philom. Paris 1821: 186 c. tab. (1821)

Ethnomedicinal use – Plants are used as Skin disease, wound, cut, stomachache and piles (Sureshkumar et al, 2018)

13. *Adiantum capillus-veneris* L., Sp. Pl. 2:1096 (1753)

Ethnomedicinal use – Plants are used as Astringent, Expectorant, Catarrhal and menstrual problems; against cough, cold and bronchial diseases, dry leaves are used for bronchitis and fever; infertility, women's disease, remove hair dandruff. Rhizome is powdered and mixed

with camphor and palm carnel oil that is used against lice, hypoglycaemic, purgative (Baskaran et al, 2018; Goswami et al. 2016)

14. *Adiantum caudatum* L., Mant. Pl. Altera 308 (1771)

Ethnomedicinal use – Plants are used as demulcent, expectorant and tonic. Against cough, fever, skin disease, Scabies, jaundice, diabetes and abdominal pain (Goswami et al. 2016).

15. *Adiantum philippense* L. Sp. Pl. 2. 1094. 1753

Ethnomedicinal use – Plants are used against dysentery also used as blood purifier, sterility treatment of women. Also used as demulcent, astringent, emenagogue and against ulcers, erysipelas, urinary diseases and bleeding from nose; used in cough, asthma, fever, leprosy and hair falling (Goswami et al, 2016; Reddy et al, 2001).

16. *Pteris multifida* Roxb., Calcutta J. Nat. Hist. 4: 507 (1844)

Ethnomedicinal use – Plants are used against diarrhoea and dysentery (Bandyopadhyay and Mukherjee, 2014; Baskaran et al, 2018)

17. *Pteris vittata* L., Sp. Pl. 2: 1074 (1753)

Ethnomedicinal use – Plants are used for wound; demulcent, hypertension, diarrhea and dysentery ; Tonic and demulcent made by plant extract used against

swellings, skin diseases, hypertension cold, cough and fever (Sureshkumar et al, 2018; Baskaran et al, 2018)

Thelypteridaceae

18. *Thelypteris prolifera* (Retz.) C.F.Reed, Phytologia 17: 306 (1968).

Ethnomedicinal use – Plants are used as tonic and against antifungal treatment (*Aspergillus niger*) (Goswami et al, 2016)

19. *Thelypteris dentata* (Forssk.) E.P.St.John, Amer. Fern J. 26(2): 44 (1936).

Ethnomodecinal use –Plants has anti-bacterial and anti-fungal activities used against sweeling, rheumatism, urinary disorders and skin disorders etc (Goswami et al, 2016; Sureshkumar et al, 2018; Manhas et al, 2018).

20. *Thelypteris lebeufii* (Baker) Panigrahi, Notes Roy. Bot. Gard. Edinburgh 33: 498 (1975) **

** This plant was newly found in reported taxa list after the work of Bandyopadhyay and Mukherjee (2014)

Ethnomodecinal use – used against wound by native people that may show some microbial properties (further research is needed).

21. *Thelypteris interrupta* (Willd.) B.C.Stone, Micronesica 22 (1965)**

** This plant was newly found in reported taxa list after the work of Bandyopadhyay and Mukherjee (2014)

Ethnomodecinal use – Plants are used against Malaria (Komlaga et al, 2015)

Among all the above mentioned taxa *Lygodium japonicum*, *Selaginella vaginata*, *Pyrrosia lanceolata* and *Thelypteris interrupta* were restricted 1 o 2 places and those places were undisturbed. If these taxa left untreated and not conserved immediately then these locally rare taxa will be extinct soon. The other taxa were disturbance resistant species and were found in urbanized regions.

Conclusion

Howrah district is one of the most urbanized districts of West Bengal that contains plenty types of industries, crop lands and large to small human colony. This anthropogenic establishments lead to the habitat fragmentation of the local vegetation. My study has found total 21 taxa belongs to 14 genera from 9 families among which almost 13 taxa were not enlisted in the IUCN red list categories. All of the taxa show high medicinal properties. Few of the taxa like *Lygodium japonicum*, *Selaginella vaginata*, *Pyrrosia lanceolata* and *Thelypteris interrupta* shows restriction to some specific locations. So, to know the the status of the individual taxa, the species richness is not sufficient but the diversity indices of individual taxa must be studied. This next step of study is going on. However, it was

observed that despite having a small area and highly disturbed vegetation, the district shows pretty good diversity of vegetation, hence a conservation of these plants are needed as pteridophytes are ecologically and ethno-medicinally very much important. It is a positive thing that few of the pteridophytes are conserved in the Botanical garden of Shibpur, Howrah.

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