



## Research Article

# Pteridophytes (Ferns and Fern Allies) diversity in Bangladesh Agricultural University Botanical Garden

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### ABSTRACT

Pteridophytes are the cryptogams having vascular bundles and are distributed all over the world. They are mostly neglected plants though they have versatile economic uses. The present study has been planned to prepare primary documentation through the taxonomic study of the Pteridophytes available in the Bangladesh Agricultural University Botanical Garden (BAUBG). Forty Pteridophyte species available in the BAUBG, Mymensingh were identified and those belong to 19 families have been documented. Among those 19 species appear to be not evaluated as those were not reported elsewhere in Bangladesh. A brief description of each species along with its family and uses has been presented in the text. A graphical presentation showing their classification and categories based on a few parameters has been provided for their easy understanding and identification.

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## Introduction

The name pteridophyte was derived from the “Greek” words, “*pteron*” means feather and “*phyta*” means plant as they have feather-like leaves. Pteridophytes, are a group of most primitive non-flowering vascular plants with almost 13600 species distributed all over the world (Linder, 2001; Krishnan and Rekha, 2021). They propagate through sexual and asexual (vegetative ways of reproduction) means but propagation through sexual spore formation is the most common way. Vegetative reproduction through fragmentation, gemmae, bulbils, etc. was also reported (Kumar, 2001). The ferns and fern allies together form the Pteridophytes, including the ferns, lycopsids, psilopsids, and horsetails. They differ from each other primarily in the pattern of organization of their plant bodies (Doyle, 1970). Pteridophytes are bridging the non-vascular cryptogams with the seed plants, continue to occupy numerous niches on the land and in marshes and swamps, and even in water bodies (Dudani et al., 2011). They have importance for food, medicinal, and

ornamental values, and thus they are extensively used in Homoeopathic, Ayurvedic, and Unani production (Uddin et al., 1998) and Tribal medicine (Vasudeva, 1999). Chinese local doctors prescribe many ferns as a source of medicine (Kimura and Noro, 1965). The ethnobotanical uses of this plant group have great significance (Singh et al., 1989; Dhiman, 1998).

In Bangladesh, 196 pteridophyte species have been reported, and most of them grow either as epiphytes, hydrophytes, mesophytes, or lithophytes (Siddiqui et al., 2007). The majority of people are ignorant about the potential uses of ferns. The economic values of the ferns have already been enumerated but a large number of ferns are yet considered to be costly for their ornamental, medicinal, or insecticidal values (Mannan et al., 2008). Pteridophytes having aesthetic appeal are recently being used for decorative purposes.

The chief aim of this primary study is to identify and record the Pteridophytes available at Bangladesh

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Agricultural University Botanical Garden, to provide an account of their taxonomic distribution, habitat diversities, utilities for medicinal, vegetable, and/or ornamental values, and finally to cross-check their availability reported elsewhere in Bangladesh.

### Materials and Methods

Bangladesh Agricultural University is one of the largest universities in Bangladesh located in the Mymensingh District. It has a well-established Botanical Garden which is situated on the west bank of the old Brahmaputra River. The garden has about 1496 plant species under 198 families and 287 genera (<https://bg.bau.edu.bd/>). The Garden is geographically located at E90°26'29.6" and N24°43'26.8" (Figure-1) with dominating Tropical Monsoon climate having a

relative humidity range from 80 to 90% in summer and about 60-70% in winter with an average rainfall of about 2000 mm (Haque et al., 2012). The present study has been planned to prepare a primary documentation through taxonomic study of the Pteridophytes available in the Bangladesh Agricultural University Botanical Garden (BAUBG). All the data were generated through field visits in the garden and those were cross-checked with The Plant List (<http://www.theplantlist.org/>) and the Encyclopedia of Flora and Fauna of Bangladesh (Siddiqui et al., 2007) for taxonomical study. The genera and species under each family have been arranged alphabetically. The valid names of each taxon and its habit, use, and conservation status have been presented in the text.

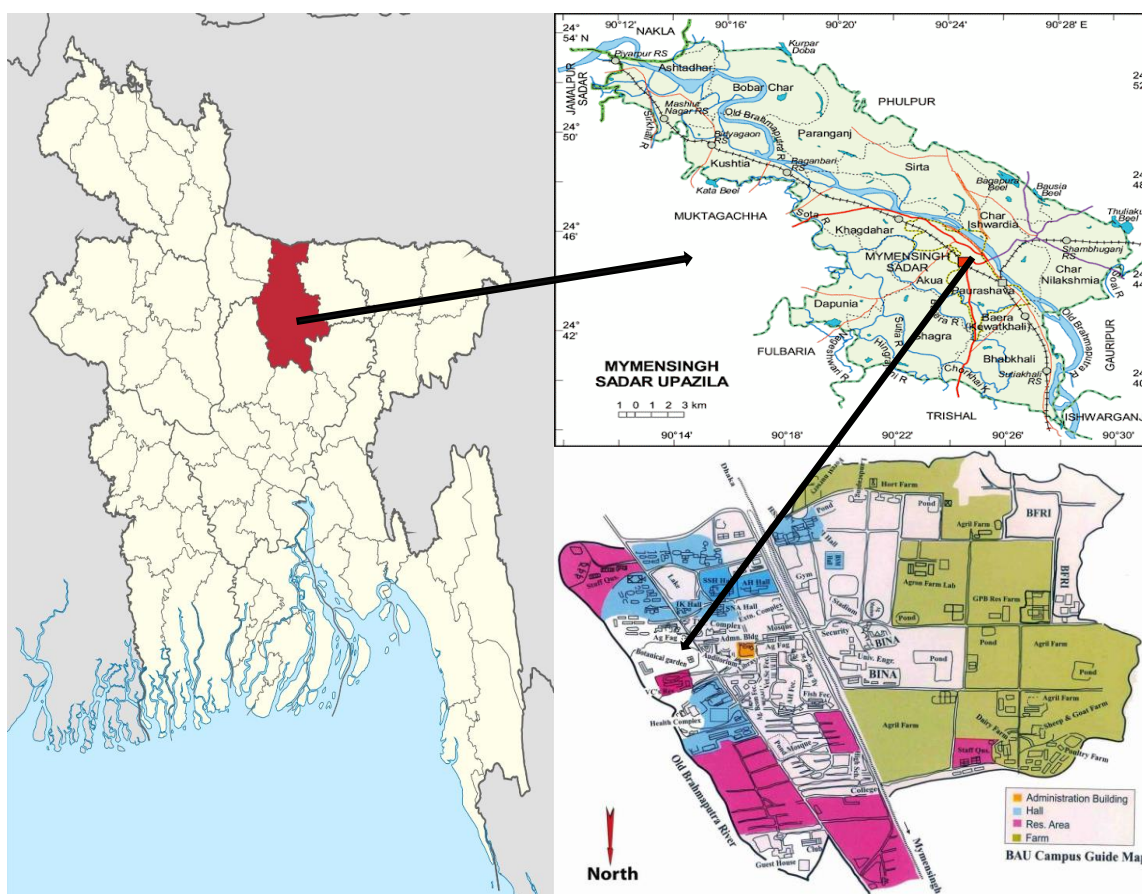


Figure 1. Bangladesh Map showing the research area (BAUBG) marked with an arrow sign

### Results and Discussion

A total of 40 species of 24 genera belong 19 families of Pteridophytes have been found in BAUBG, Mymensingh. Most of the available species are herbs which are about 34 out of 40 species, while 2 of them are tree-like ferns and 4 are climbers. Here, the highest number of genera (three) was recorded under Pteridaceae followed by Athyriaceae, Polypodiaceae, and Thelypteridaceae where two genera were recorded

under each family. The rest of the 15 families had only one genus. Adiantaceae and Asparagaceae each family had the maximum species (five) followed by Pteridaceae which had four species. About 9 families consisted of a single species. About 57 percent of total Pteridophytes were found to grow solely in terrestrial habitats while 12 percent to grow solely in aquatic habitats and the rest were amphibian i.e., those were found to grow both in terrestrial and aquatic or other

habitats. A total of 23 species can be used as medicine while 25 species can be used as ornamental plants. Nine of the species can be consumed as a vegetable while 8 of them are used for other purposes like mulch or organic matter. About 19 species were found as new in the botanical garden as those were not evaluated or listed elsewhere in Bangladesh. For each species, up-to-date nomenclature, short descriptions, and uses have been mentioned below.

*Acrostichum aureum L*

Synonym: *Acrostichum guineense* Gaudich.

Description: The golden leather fern, is a large herb species of fern that grows in mangrove swamps and other wet locations. It can grow in full sun or shady places.

Use: Used in traditional medicine, fronds are shredded or crushed and applied as a poultice on wounds, boils, or ulcers. In India, the fronds are used to treat snake bites ([www.nparks.gov.sg](http://www.nparks.gov.sg))

*Adiantum capillus-veneris L.*

Synonym: *Adiantum capillus* Sw.

Description: An evergreen, perennial herb grows on streambanks in riverine forests, in evergreen forests, and deciduous woodland. They can be Epiphytic, lithophyte, and terrestrial (Figure 6-A).

Use: The plant is considered to be a bronchio-dilator, diuretic and pectoral. It is used extensively in India for the treatment of fevers in children. It is a constituent of 'Hansraj', a preparation used in India for the treatment of coughs. The root is considered good for treating fever and elephantiasis. Frond infusion is used for jaundice therapy (Tewary et al., 2017). A decoction of the root is used in the treatment of throat affections

*Adiantum mendoncae Alston*

Synonym: Not found

Description: A small and delicate herb, Lithophyte, terrestrial.

Use: Used for bronchitis, coughs, whooping cough, and heavy menstruation with cramps. Also used to loosen chest congestion.

*Adiantum philippense L.*

Synonym: *Adiantum arcuatum* Sw.

Description: A small and delicate herb grows in a creeping or semi-erect position. It grows on stream banks, often on rocks in forests and woodland (Figure 6-B).

Use: Used as stomachic and diuretic, as a cure for dysentery also used in the treatment of cough, leprosy, hair falling, fever, and burning sensation (Uddin et al., 1998). Also used as an ornamental plant.

*Adiantum tenerum Sw.*

Synonym: *Adiantum extensum* Fée

Description: A small and delicate herb grows in a creeping position, semi-erect. Generally, grows in shady places.

Use: Commonly cultivated as an ornamental plant in botanical gardens also used as demulcent, expectorant, and sudorific, for bronchial and catarrhal affections (Uddin et al., 1998).

*Adiantum trapeziforme L.*

Synonym: *Adiantum trapeziforme* var. *oblongatum* T. Moore

Description: One of the long-lasting herbs that are often being grown for its dainty and attractive foliage.

Use: Used as ornamental plant excellent for container gardening.

*Angiopteris evecta (G. Forst.) Hoffm.*

Synonym: *Polypodium evectum* G. Forst.

Description: Terrestrial giant herb often very large commonly found on the forest floor. May also grow near shady streams, riverbanks, or steep clay slopes (Figure 6-C).

Use: Used to arrest discharge of blood after miscarriage, to treat beriberi, leaves, and rhizomes are used as intoxicant juice (Uddin et al., 1998a). The species is also used as an ornamental plant (deWinter and Amoroso, 2003).

*Asparagus densiflorus (Kunth) Jessop*

Synonym: *Asparagus myriocladus* Baker

Description: *Asparagus densiflorus* is a scrambling, perennial herb. The appearance of the plants varies enormously and has led to the naming of a large number of cultivars or forms, usually grown under glass. The berries they produce are attractive to birds and may be spread by them.

Use: The foliage can also be incorporated as a filler with cut flowers in arrangements. The feathery short stems are found in almost every bunch of cut flowers as foliage.

*Asparagus officinalis L.*

Synonym: *Asparagus altilis* (L.) Asch.

Description: *Asparagus officinalis* is a perennial herb that grows in semi-shade (light woodland) or no shade and can tolerate maritime exposure.

Use: The tender shoots, roots, and underground stems are used to make medicine. Asparagus is used as irrigation therapy to increase urine output. Also used to treat urinary tract infections and other conditions that cause pain and swelling. Stems of this fern can also be eaten.

*Asparagus plumosus Baker Willd. (Kunth) Jessop*

Synonym: *Protasparagus plumosus* (Baker) Oberm.

Description: A long-lived herb with stems that grow in a twining fashion. They need bright indirect sunlight. Flowers are produced from spring to early autumn.

Use: One of the fastest-growing least demanding houseplants used as an ornamental plant. Stems of this fern can also be eaten.

*Asparagus racemosus Willd.*

Synonym: *Asparagopsis abyssinica* Kunth

Description: A climbing herb producing blackish-purple, globular berries. They produce hundreds of tuberous roots of about one meter in length, thus known as Shatamuli (Figure 6-D).

Use: Widely used in Ayurvedic medicine. Extract from dried roots is used for many reproductive and hormonal issues in women (Hechtman, 2018). Also used for gastric ulcers and indigestion (Goyal et al., 2003).

*Asparagus setaceus (Kunth) Jessop*

Synonym: *Asparagus lujae* De Wild.

Description: A fast-growing climbing perennial herb usually grows as a terrestrial plant. Found elsewhere as an ornamental plant but the fruit of this plant might be toxic and should not be eaten.

Use: Widely grown as an ornamental plant. Extracts from the shoots are used for heart diseases.

*Asplenium nidus L.*

Synonym: *Asplenium australasicum* (J. Sm.) Hook.

Description: Epiphytic or terrestrial herb grows often in palm trees, with large banana leaf-like fronds. The fronds roll back and create a large nest-like structure in the branches and trunks of trees (Figure 6-E).

Use: Used as an anti-bacterial agent (Nath et al., 2017). Also used as an Ornamental Plant.

*Athyrium accedens (Blume) Milde*

Synonym: *Diplazium accedens* Blume

Description: Large terrestrial herb grows in the low land forest. Grows in shaded to semi-shaded areas. Cultivated for its attractive fronds.

Use: Can be used as an ornamental plant. In Madagascar, young plants are used as cooked vegetables.

*Azolla filiculoides Lam.*

Synonym: *Azolla arbuscula* Desv.

Description: A fastest growing floating aquatic herb having the ability to fix nitrogen from air by the symbiosis process with *Nostoc azollae*.

Use: Frequently cultivated in aquarium or pond. They can fix N 500kg/ha (Aziz, 2001a). In many regions of the old world, it is used to enhance the growth of aquatic crops also used as green manure (Lumpkin and Plucknett, 1982).

*Azolla pinnata R. Br.*

Synonym: Not found.

Description: A small herb with a triangular frond. It is usually found floating upon the surface of water bodies. They can fix nitrogen from the air through the symbiosis process with *Anabaena azollae*.

Use: Used in the rice field to add nitrogen, used to remove heavy metals from contaminated water, also added to chicken feed.

*Balantium antarcticum (Labill.) C. Presl*

Synonym: *Dicksonia antarctica* Labill.

Description: An Evergreen tree fern grows up to 15 meters and consists of a clear fibrous trunk that is a host for a wide range of epiphyte or other ferns. It grows in shady damp places.

Use: The pith of this plant is eaten as a source of starch.

*Blechnum finlaysonianum Wall.*

Synonym: Not found.

Description: Terrestrial herb of humid lowland never grows in full shade, usually large to moderate in size. The plant is one of the primary colonizers after forest clearing.

Use: Used as a diaphoretic, aromatic, appetitive, and poultice. Rhizomes are also prescribed for urinary complications (de Winter and Amoroso, 2003). Young leaves of all *Blechnum* species are eaten as a vegetable in Papua New Guinea and the Philippines, and cultivated as ornamental plants.

*Cyathea gigantea Wall. Ex. Hook.*

Synonym: *Alsophila gigantea*

Description: Tree-like herb, relatively taller than other tree ferns with a trunk of about 2 to 7-meter-long. The trunk is so soft with loosely attached fibres and leaf bases (Figure 6-F).

Use: Used as avenue plant for its erect and straight tree-like structures. Also used as ornamental house plants.

*Cyclosorus opulentus (Kaulf.) Nakaïke*

Synonym: *Nephrodium opulentum* (Kaulf.) C. Presl

Description: Herb with a short creeping rhizome, found in the vicinity of freshwater swamps. They are cultivated as they are likely to be a useful landscape plant if kept damp and in gardens free of frost.

Use: Rhizomes are edible. Also used in herbal medicine.

*Diplazium esculentum (Retz.) Sw.*

Synonym: *Anisogonium esculentum* (Retz.) C. Presl

Description: A terrestrial herb, with a short and erect rhizome that is occasionally trunk-like or can be creeping. Its fronds are deciduous or evergreen.

Use: Leaves are used as a tonic for women after they have given birth and are also used as vegetables.

*Helminthostachys zeylanica* (L.) Hook.

Synonym: *Ophiala zeylanica* (L.) Desv.

Description: Terrestrial herb, known as “Flowering Fern”, with a thick slowly creeping rhizome. Grows in shady damp places. Produces a beautiful flower that looks like a spike (Figure 6-G).

Use: Rhizome is used as a mild laxative. Also used against malaria and for the treatment of sciatica. Can be grown as an ornamental plant. Can be used for food and fibre.

*Lygodium flexuosum* (L.) Sw.

Synonym: *Hydroglossum flexuosum* (L.) Willd.

Description: *Lygodium flexuosum* is a slender, evergreen, climbing herb with a short-creeping rhizome. It can quickly cover unsightly structures and provide shade for other plants (Figure 6-H).

Use: Used as an expectorant. applications for Eczema, Scabies, Rheumatism, Sprains, and cut wounds. Likewise, in Bangladesh, the juice of the whole plant of *Lygodium* sp. is applied to insect bites.

*Microsorium punctatum* (L.) Copel.

Synonym: *Acrostichum punctatum* L. f.

Description: Epiphytic or lithophyte herb grows in Semi-evergreen and evergreen forests, and have an erect rhizome. This cultivar is fast-growing (Figure 6-I).

Use: Leaves are eaten as vegetables, chewed rhizome of the species is applied to lizard bites, and used as a remedy for chronic diarrhoea. Can be cultivated as an indoor ornamental.

*Microsorium scolopendria* (Burm. f.) Copel.

Synonym: Not found.

Description: Wart fern species have short or widely creeping rhizomes that are often enveloped in felt roots. Epiphyte, Lithophytes herb.

Use: Fronds are fragrant and used for scenting clothes & coconut oil. Also used as ornamental plants as they have very beautiful foliage.

*Nephrolepis cordifolia* (L.) C. Presl

Synonym: *Aspidium cordifolium* (L.) Sw.

Description: Epiphytic, epilithic (on rock), or terrestrial herb inhabit typically grows in woodland areas. It is regarded as an environmental weed (Figure 7-A).

Use: Used as an antibacterial and anti-fungal agent. Also used as an ornamental plant.

*Nephrolepis exaltata* (L.) Schott

Synonym: *Aspidium exaltatum* (L.) Sw.

Description: An indoor herb that can be grown outdoors in warm areas. They have various cultivars available. They require indirect lights to grow well (Figure 7-B).

Use: Used in traditional medicine against cough. Also used as an ornamental plant.

*Nephrolepis falcata* (Cav.) C. Chr.

Synonym: *Tectaria falcata* Cav.

Description: This large tropical to sub-tropical evergreen herb, leaflet tips are once or twice forked like a fish’s tail giving an unusual appearance (Figure 7-C).

Use: Cultivated in hanging pots as an ornamental plant. Cut fronds are a lovely addition to floral arrangements. Leaves are eaten as a vegetable. Rhizomes and young shoots are eaten as a vegetable.

*Phymatosorus scolopendria* (Burm. f.) Pic. Serm.

Synonym: *Chrysopteris phymatodes* (L.) Link

Description: Epiphyte, Lithophytes herb. Usually grows in disturbed areas, secondary forests, and coral rock crevices.

Use: It is an excellent ground cover, cultivated as a bedding plant. Cut fronds are added to flower arrangements. Fronds are fragrant and used for scenting clothes

*Pityrogramma calomelanos* (L.) Link

Synonym: *Acrostichum calomelanos* L.

Description: A terrestrial herb, closely tufted, rhizomatous fern up to about 1 m tall. Usually grows on rocks and roadsides (Figure 7-D).

Use: Leaves are used externally to heal wounds and stop bleeding

*Pteridium arachnoideum* (Kaulf.) Maxon

Synonym: *Allosorus arachnoideum* (Kaulf.) C. Presl

Description: One of the world’s most powerful weeds. It invades abandoned or newly burned areas. Terrestrial herb.

Use: bracken was traditionally used as mulch, for animal bedding. Can be used as an insecticide.

*Pteris ensiformis* Burm.f.

Synonym: *Pteris ensiformis* var. *ensiformis*

Description: A small terrestrial herb of shady areas. There is an exotic cultivar with variegated fronds that have been naturalized. It has a creeping rhizome bearing fronds close together. Prefers moist soil, and does not appreciate direct light (Figure 7-E).

Use: The juice of the young plant is stated to possess astringent properties; A decoction of fresh fronds is given in dysentery. The juice extracted from the rhizome is applied for glandular swellings of the neck (deWinter and Amoroso, 2003).

*Pteris ensiformis-victoriae*

Synonym: *Pteris ensiformis* var. *ensiformis*

Description: A slow-growing evergreen herb. Fronds with the silver-whitish centre, grow to 20 - 30 cm long. Prefer Semi-Shade.

Use: Used as an ornamental plant.

*Salvinia cucullata* Roxb.

Synonym: Not Found

Description: A small free-floating aquatic herb can be identified by cup-shaped floating leaves that look like the ears of rats that's why it is commonly known as "IndurKani" in Bangla (Figure 7-F).

Use: Harvested biomass is composted and applied in crop fields for nutrients. It is used as a shelter for fish in ponds. Also used as an ornamental plant in an aquarium.

*Salvinia adnata* Desv.

Synonym: *Salvinia molesta* D.S. Mitch.

Description: A small free-floating aquatic herb prefers tropical, sub-tropical, or warm temperate areas. In standing water, it forms a floating mat-like structure. The plant exhibits great morphological variation depending on the conditions of the habitat (Figure 7-G).

Use: Floating aquatic weeds have been used for compost, paper making, mulch, fodder, handcrafts, and bio-gas generation (Howard and Harley, 1997). Also used as an ornamental plant.

*Salvinia natans* (L.) All.

Synonym: *Marsilea natans* L.

Description: A small free-floating aquatic herb can eventually cover entire ponds or lakes without ecological competition, starving other plant species.

Use: Harvested biomass is composted and applied in crop fields for nutrients. It is used as a shelter for fish in ponds. Also used as an ornamental plant in an aquarium.

*Selaginella moellendorffii* Hieron.

Synonym: *Lycopodioides moellendorffii* (Hieron.) H.S. Kung

Description: Terrestrial or epilithic, evergreen herb grows on sunny banks and riverbanks, and in shady places (Figure 7-H).

Use: Used as an Antithyperuricemic, Anti-Inflammatory, and Xanthine Oxidase Inhibition.

*Selaginella uncinata* (Desv. ex Poir.) Spring

Synonym: *Lycopodioides uncinatum* (Desv. ex Poir.) Kuntze

Description: Terrestrial herb, with small foliage forming diffuse mats. Perfect for shady locations with rich well-drained soil that retains moisture (Figure 7-I).

Use: Widely cultivated outdoor along the gulf coast for its ornamental values. In folk medicine, commonly used to treat cough and asthma.

*Tectaria cicutaria* (L.) Copel

Synonym: *Polypodium cicutarium* L.

Description: Terrestrial herb having round button-like bulbils, with thin, soft, and triangular fronds.

Use: Rhizomes are widely used to treat various ailments in the Ayurvedic system such as rheumatic pain, burns, sprains, tonsillitis, etc. (Choudhari et al., 2013)

*Thelypteris serrata* (Cav.) Alston

Synonym: *Dryopteris reticulata* var. *serrata* (Cav.) Farw.

Description: Perennial evergreen herb with large fronds. Usually grows in Cypress swamps, sloughs, and floodplains.

Use: Commonly consumed as vegetables.

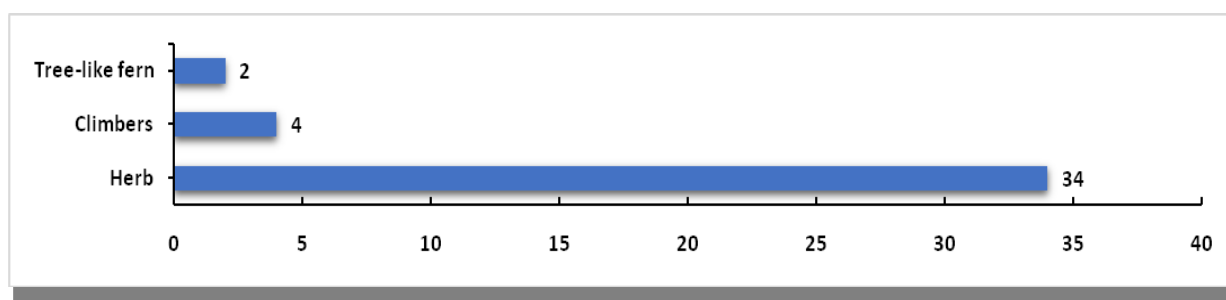


Figure 2. Number of species grouped based on their habit

**Table 1.** List of Pteridophytes along with their scientific name, habitat, possible use, and conservation status

SL	Family & Common name	Scientific name	Habitat	Use	CS
<b>Adiantaceae</b>					
1	Black Maidenhair	<i>Adiantum capillus-veneris</i> L.	T, L, E	M	LC
2	Maidenhair Fern	<i>Adiantum mendoncae</i> Alston	T, L	M	NE
3	Filipino pakha	<i>Adiantum philippense</i> L.	T, L	M, O	LC
4	Brittle maidenhair Fern	<i>Adiantum tenerum</i> Sw.	T	M	LC
5	Diamond Maidenhair	<i>Adiantum trapeziforme</i> L.	T	O	NE
<b>Asparagaceae</b>					
6	Foxtail Fern	<i>Asparagus densiflorus</i> (Kunth) Jessop	T	O	NE
7	Sparrow Asparagus fern	<i>Asparagus officinalis</i> L.	T	M, V	NE
8	Feathered Asparagus Fern	<i>Asparagus plumosus</i> Baker	T, E	O, V	NE
9	Shatavari, Satawar	<i>Asparagus racemosus</i> Willd.	T	M	NE
10	Ferny Asparagus	<i>Asparagus setaceus</i> (Kunth) Jessop	T	M, O	NE
<b>Aspleniaceae</b>					
11	Bird's nest Fern	<i>Asplenium nidus</i> L.	T, E	M, O	LC
<b>Athyriaceae</b>					
12	Lady-Fern	<i>Athyrium accedens</i> (Blume) Milde	T	O, V	NE
13	Fiddlehead Fern	<i>Diplazium esculentum</i> (Retz.) Sw.	T	M, V	LC
<b>Azollaceae</b>					
14	Red Water velvet	<i>Azolla filiculoides</i> Lam	A	O, OT	LC
15	Water velvet	<i>Azolla pinnata</i> R. Br.	A	O, OT	LC
<b>Blechnaceae</b>					
16	Hard Fern	<i>Blechnum finlaysonianum</i> Wall.	T	M, O, V	NE
<b>Cyatheaceae</b>					
17	Tree fern	<i>Cyathea gigantea</i> Wall. Ex. Hook.	T	O	LC
<b>Dennstaedtiaceae</b>					
18	Tropical Bracken fern	<i>Pteridium arachnoideum</i> (Kaulf.) Maxon	T	OT	NE
<b>Dicksoniaceae</b>					
19	Man Fern	<i>Balantium antarcticum</i> (Labill.) C. Presl	T	O	NE
<b>Helminthostachyaceae</b>					
20	Kamraj	<i>Helminthostachys zeylanica</i> (L.) Hook.	T	M, O	CR
<b>Lygodiaceae</b>					
21	Japanese climbing fern	<i>Lygodium flexuosum</i> (L.) Sw.	T	M	LC
<b>Marattiaceae</b>					
22	Giant Fern	<i>Angiopteris evecta</i> (G. Forst.) Hoffm.	T	M, O	LC
<b>Nephrolepidaceae</b>					
23	Ladder Fern	<i>Nephrolepis cordifolia</i> (L.) Schott	T, L, E	M, O	CD
24	Boston Fern	<i>Nephrolepis exaltata</i> (L.) C. Presl	T	M, O	LC
25	Fishtail Fern	<i>Nephrolepis falcata</i> (Cav.) C. Chr.	T	O, V	NE
<b>Polypodiaceae</b>					
26	Fishtail Strap-Fern	<i>Microsorium punctatum</i> (L.) Copel.	E, L	M, O, V	LC
27	Wart Fern	<i>Microsorium scolopendria</i> (Burm. f.) Copel.	E, L	O, OT	NE
28	Wart Fern	<i>Phymatosorus scolopendria</i> (Burm. f.) Pic. Serm.	E, L	O, OT	NE
<b>Pteridaceae</b>					
29	Tiger fern/Hodo	<i>Acrostichum aureum</i> L.	T	M	LC
30	Silver Fern	<i>Pityrogramma calomelanos</i> (L.) Link	T, L	M	LC
31	Silver lace Fern	<i>Pteris ensiformis</i> Burm. f.	T	M	LC
32	Victoria Fern	<i>Pteris ensiformis</i> Victoria	T	O	LC
<b>Salviniaceae</b>					
33	Aquarium Water Moss	<i>Salvinia adnata</i> Desv.	A	O, OT	LC
34	Floating Fern	<i>Salvinia cucullata</i> Roxb.	A	O, OT	LC
35	Floating moss	<i>Salvinia natans</i> (L.) All.	A	O, OT	LC
<b>Selaginellaceae</b>					
36	Spike moss	<i>Selaginella moellendorffii</i> Hieron.	T, L	M	NE
37	Peacock Moss	<i>Selaginella uncinata</i> (Desv. ex Poir.) Spring	T	M	NE
<b>Tectariaceae</b>					
38	Button Fern	<i>Tectaria cicutaria</i> (L.) Copel.	T	M	NE
<b>Thelypteridaceae</b>					
39	Swamp Shield-Fern	<i>Cyclosorus sopulentus</i> (Kaulf.) Nakaike	T, A	M, V	NE
40	Toothed Lattice-vein Fern	<i>Thelypteris serrata</i> (Cav.) Alston	T	V	NE

Habitat: A=Aquatic, E=Epiphyte, L=Lithophytes, T=Terrestrial.

Use: M=Medicinal, O=Ornamental, V=Vegetable, OT=Others.

Conservation status (CS): LC= Least Concerned, CD= Conservation dependents, CR= Critically endangered, NE= Not Evaluated.

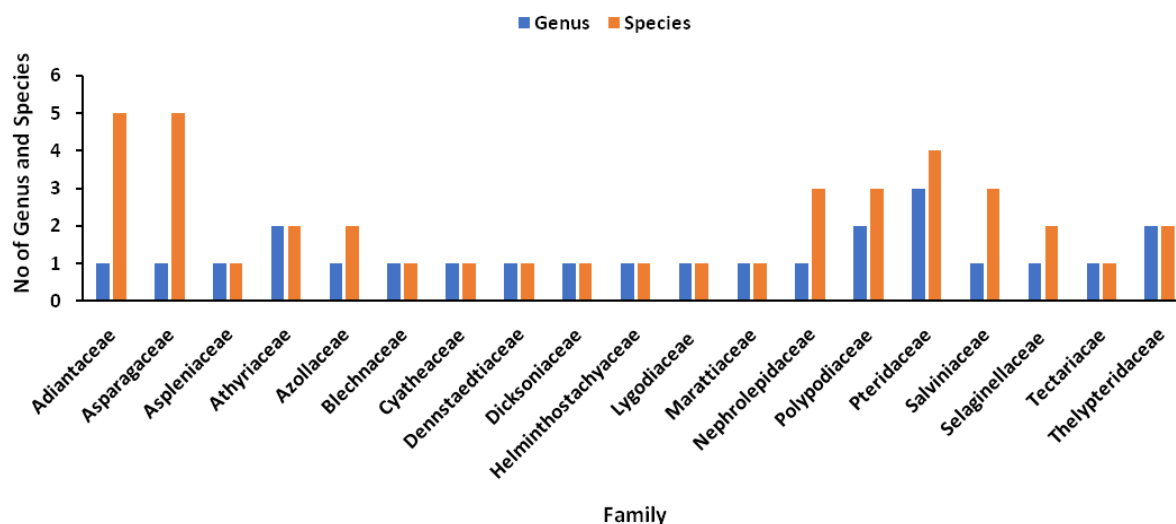


Figure 3. Generic and species distribution of the available Pteridophytes in BAUBG under different families

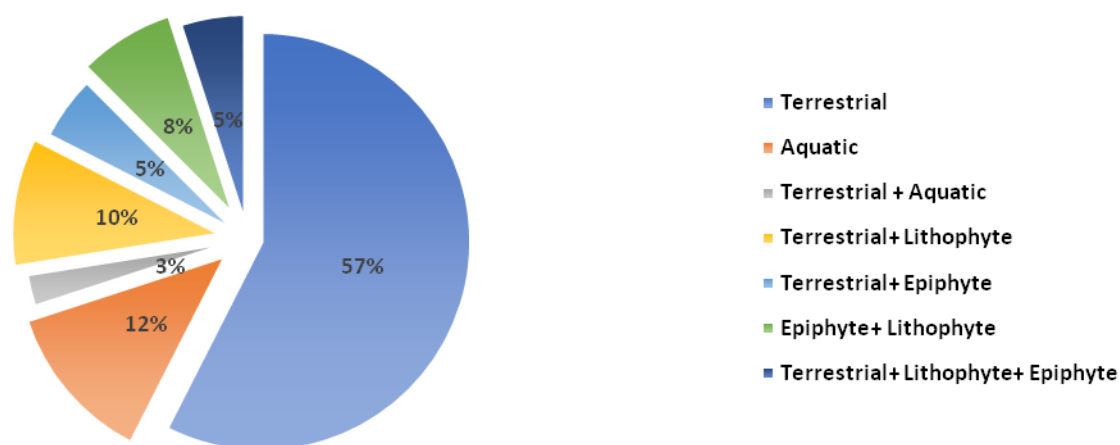
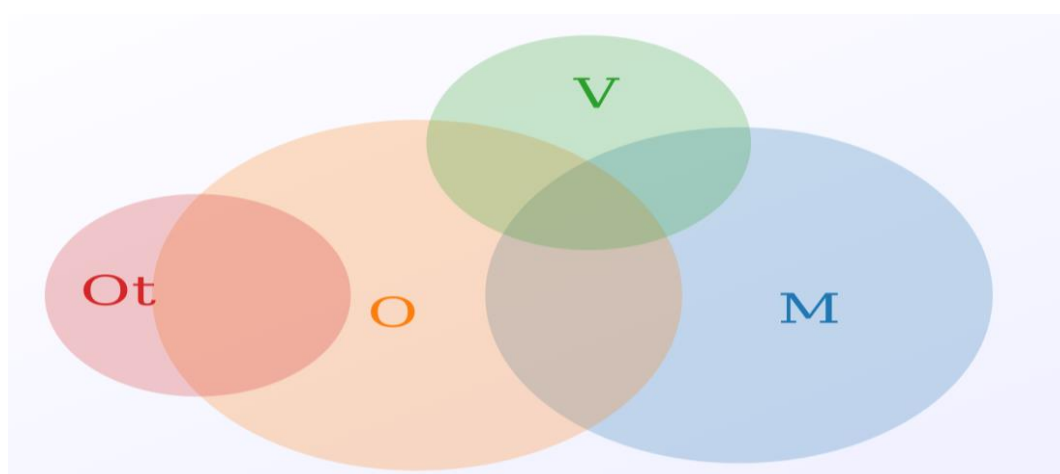


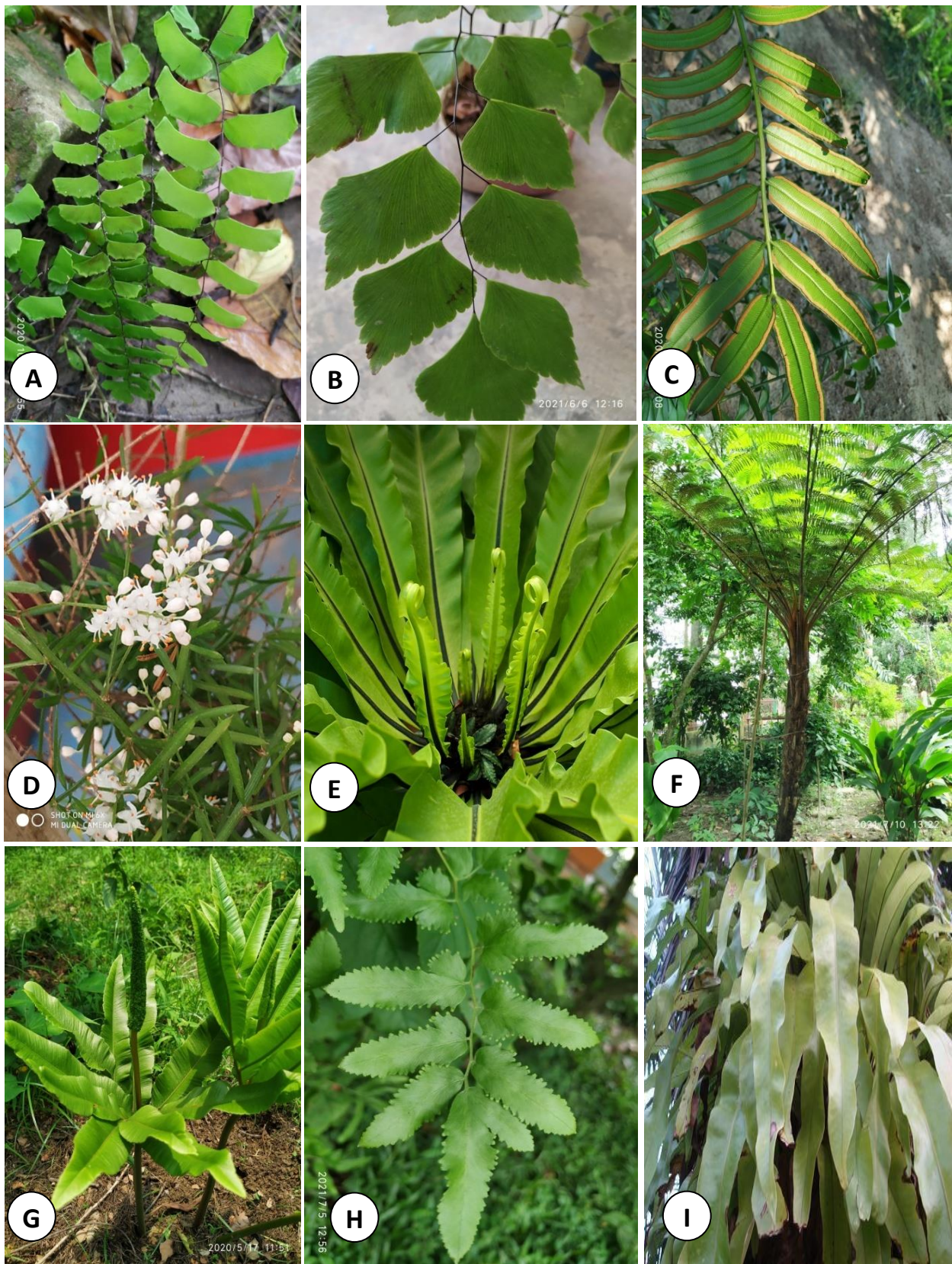
Figure 4. Percentage of Pteridophytes according to their habitat



M = Medicinal, O = Ornamental, V = Vegetable, Ot = Others

Figure 5. Distribution of Pteridophytes according to their uses





**Figure 6.** A. *Adiantum capillus-veneris* L. B. *Adiantum philippense* L. C. *Angiopteris evecta* (G. Forst.) Hoffm. D. *Asparagus racemosus* Willd. E. *Asplenium nidus* L. F. *Cyathea gigantea* Wall. Ex. Hook. G. *Helminthostachys zeylanica* (L.) Hook. H. *Lygodium flexuosum* (L.) Sw. I. *Microsorium punctatum* (L.) Copel.



**Figure 7.** A. *Nephrolepis cordifolia* (L.) B. *Nephrolepis exaltata* (L.) C. Presl C. *Nephrolepis falcata* (Cav.) C. Chr. D. *Pityrogramma calomelanos* (L.) Link E. *Pteris ensiformis* Burm. f. F. *Salvinia cucullata* Roxb G. *Salvinia adnata* Desv. H. *Selaginella moellendorffii* Hieron. I. *Selaginella uncinata* (Desv. ex Poir.) Spring

## Conclusion

Forty species of Pteridophytes available at BAUBG were identified and recorded along with nineteen new species which have not been reported elsewhere in Bangladesh. Most of the Pteridophytes are widely used as vegetables and traditional medicine for treating various ailments and some of them have ornamental value. Finally, the results would provide a baseline study of the diversity of Pteridophytes in Bangladesh along with their habitats, utilities, and conservation status, and also give a primary data source for further study by the scientific community.

## Authors contribution

M.J.H. Jone and M. Ashrafuzzaman designed the experiments, collected samples, and analyzed the data for first draft of the manuscript. M. Ashrafuzzaman and Md. H.R. Pramanik evaluated the result, data and edited the manuscript for submission in the journal and finally M.J.H. Jone reedited the manuscript as per comments of the reviewer. All authors read the article and approved the final version to be published.

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