

Survey for pteridophytic diversity in Madan Kamdev Hill region of Assam, India

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Abstract

The present survey on the distribution of ferns and fern-allies in different localities of Madan Kamdev Hill region and its adjoining areas of Kamrup district of Assam recorded the occurrence of fifty species. The survey was carried out from April 2012 to March 2014. A brief enumeration and identification have been provided in the article along with their description, sporulating time, habitat, distribution and use.

Key words: Pteridophyte, Diversity, Madan Kamdev, Assam

INTRODUCTION

Pteridophytes are non-flowering, vascular and spore bearing plants including ferns and fern-allies. They grow luxuriantly in moist tropical and temperate forest and their occurrence in different eco-geographically regions. The world flora contains approximately 12,000 species of pteridophytes of which over 1200 species of ferns and fern-allies have so far reported from the territory of India (Dixit 1984; Chandra 2000). The pteridophytes being an important part of the flora of a region form the next important major taxon after angiosperms. The north eastern region of India is one of the most floristically rich zones of the country. The highest numbers of ferns (about 700 species) are occurring in the Eastern Himalaya and its adjoining states making it one of the Hotspots of diversity centre for pteridophytes (Dixit 2000).

In the present political boundary of Assam some workers have done systematic works in ferns including Kachroo (1953); Panigrahi (1960 & 1968); Panigrahi & Chowdhury (1961 & 1962); Dutta *et al.* (1980); Handique & Konger (1986); Bir *et al.* (1989); Kachroo *et al.* (1989); Vasudeva *et al.* (1990); Borthakur *et al.* (2001); Devi & Majumdar (2003) and Sen & Ghosh (2011).

Madan Kamdev hill region and its adjoining areas are situated on the north bank of the river Brahmaputra in the Kamrup district of central Assam, India. Geographically it is located in between 26°10'-26°20' N Latitude and 91°40' - 91°50' E Longitude with an area of 450 sq km. Madan Kamdev hill range is historically famous for Madan Kamdev Devalaya on the same named hill in the north part of the study area. Due to its magnificent archeological ruins and sensual sculptures Madan Kamdev Devalaya is rightly called the "Khajuraho of the East." It is a hilly tract of land which was the treasure house of the ancient Assam. Geomorphologically, the area comprises of about 25 hills and tillas *viz.*

Madan Kamdev, Nrasinhas, Barpahar, Bhitorkhola, Dhakera, Gopeswar, Jalposwar, Nadinga, Mandakata, Dirgeswari hill range, etc. Side by side a number of water bodies or wetlands, lake (*bil*), rivulet (*jans*), wasteland (*pitoni*), etc. like Madankuri, Daloipith, Paddypara, Bamunibeel, Pakadhowa, Naldanga, Jendiabeel, etc. are also covering the area. The river Bornodi and tributary Madankuri flows through the area to the river Brahmaputra. The maximum elevation of the hillock of the area is 350 m. The soil of the area is mainly alluvial and acidic with pH ranging from 5.01 – 5.95. However, in some places, negligible patches of alkaline soils are also available (Goswami 1960). The average annual rainfall is 1914.88 mm and highest Relative humidity recorded 88.46 % in the month of January. The temperature usually varies from 7° C to 38.5° C throughout the period.

The general vegetation of the area is tropical humid forests. The pteridophytic vegetation is on account of species diversity and peculiar formation occupies an important natural habitat place on the route of dispersal of fern flora in the area. The pteridophytic vegetation of the area can be studied as (i) Epiphytic, (ii) Terrestrial, (iii) Climbers, (iv) Lithophytic, (v) Hydrophilous vegetation, etc.

The area with several vegetation types, hills, wetlands, natural resources, etc. also attracted not only to the academicians, scientists, tourists, foresters, traders, planners, NGO's and all those interested in plants and plants wealth of Assam in general and the area in particular. Except some sporadic collection in different times by few workers, the area still remains botanically unexplored in fern diversity.

The increasing human population along the boundaries of reserve forests, gradual urbanization, industrialization and establishments of rock quarries, occupying beels and wetlands to cultivated lands are some of the vital factors responsible for changing the floristic patterns causing degradation of forest wealth. Keeping in view the future information and record, the present scientific study on the fern diversity of Madan Kamdev hill region, Kamrup district, Assam, India has been undertaken.

MATERIAL AND METHODS

Different parts of Madan Kamdev Hill region and its adjoining areas, Kamrup district of Assam, India was surveyed for the pteridophytic flora during 2012 – 2014. Collected specimens were made into mounted on herbarium sheets following Jain & Rao (1977).

The specimens were identified by using different taxonomical literature (Baishya & Rao 1982; Jamir & Rao 1988; Borthakur *et al.* 2001; Singh & Panigrahi 2005; Jenkins 2008) and finally confirmed by matching at the ASSAM Herbarium. The correct and updated nomenclature of the collected voucher specimens were determined through checking with the Plant List (www.theplantlist.org) and IPNI. During the field survey, information on plant parts used for different purposes was collected from tribal women and persons with adequate knowledge. The voucher specimens are deposited in the herbarium of Botany Department, Pub Kamrup College, Baihata Chariali, Kamrup, Assam, India.

ENUMERATION

The recorded fern species have been enumerated with names of family and genera which have been arranged according to Christenhusz *et al.* (2011) system of classification. Nomenclatural citations are arranged by a brief description, sporulation, exsiccatus, habitat, present status distribution and their uses.

LYCOPODIACEAE

Lycopodiella cernua (Linnaeus) Pichi-Sermolli in webbia 23: 166. 1968; Ollgaard in Kramer & Green, Fam. Gen. Vasc. pl. 1: 38. 1990; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 48. 2005. *Lycopodium cernuum* Linnaeus, Sp.Pl. 2: 1103. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 22. 1982.

Terrestrial. Main branches prostrate, creeping; rooting in clumps at definite intervals. Fertile branches erect, divaricate. Leaves spirally arranged, decurrently on the stem, linear, acute, finally ciliate. Strobili distinct, sessile, oblong, upto 1cm long, pendulous, solitary at the end of the branches, compact; sporophylls spirally arranged; sporangia oval, whitish-yellow; spores trilete, hyaline and smooth.

Sporulation: Almost round the year.

Exsiccatus: Gopeswar Pahar, *PC Kalita 0075*, dated 20.09. 2012.

Habitat: Frequent in exposed forest fringes, secondary forest, slopes of cuttings and wet areas of Gopeswar pahar.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh]; MALAWI, S. AFRICA, ZAMBIA, TROPICS and SUBTROPICS.

Uses: Reported decoction of plant is used in cough, asthma, skin eruption and uneasiness in the chest. The rhizome is also used for nervous disorders and rheumatism.

Lycopodium clavatum Linnaeus, Sp. Pl. 2: 1101. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 22. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 51. 2005.

Terrestrial. Stem branches prostrate, wide creeping. Fertile branches short, erect-procumbent, dichotomous. Leaves spirally arranged, linear, acute, entire, rigid. Strobili upto 6.5cm long, pedicellate, curved and pendulous; peduncle long, erect, slender, terminal. Sporophylls deltoid; sporangia reniform.

Sporulation: July – December.

Exsiccatus: Borpahar, *PC Kalita 0195*, dated 05.08. 2013.

Habitat: Common, forming mat over grasses and hilly slopes of Borpahar.

Distribution: INDIA [Throughout the subtropical and temperate mountainous regions]; NEPAL, BHUTAN, MYANMAR, THAILAND, CHINA, S. & N. AMERICA, S. AFRICA, MALWAI, MADAGASCAR, SWAZILAND, ZAMBIA and EUROPE.

Uses: It relieves arthritis pain, in addition to physical ailments; also used to treat kidney conditions that cause blood to enter the urine.

SELAGINELLACEAE

Selaginella decipiens Warburg, Monsonia 1: 127. 1899; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 26. 1982.

Terrestrial. Stem erect, upto 30cm, branched; rhizophore absent. Leaves glossy green, membranous, dimorphic; leaves on the main stem cordate-acuminate, spiral. Strobilus upto 0.8cm long; sporophylls acuminate, entire. Sporangia yellowish-green; spore very small, oval-triangular, greenish in colour.

Sporulation: September – January.

Exsiccatus: Baihata, *PC Kalita 0120*, dated 20.11.2012.

Habitat: Common, in moist and shady humus localities and in road sides of Baihata.

Distribution: INDIA [NE states]; CHINA, AFRICA, MADAGASCAR and ASIA.

Uses: Plant juices are traditionally used in healing wounds, cuts, after child birth and menstrual disorder.

Selaginella monospora Spring in Mem. Acad. Roy. Sci. Belg. 24:135.1850; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 27. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 62. 2005.

Terrestrial. Plants upto 40 cm long, prostrate-ascending, branching; rhizophores arisen at the dichotomous forking of the stem. Leaves dimorphic, glossy green, coriaceous, midrib prominent; lateral leaves oblique, ovate. Strobili upto 8mm long, terminal, simple; sporophylls spiral, acuminate and dentate. Spores greenish.

Sporulation: October – January.

Exsiccatus: Bahgarah, *PC Kalita 0150*, dated 10.01.2013.

Habitat: Common, in shady places, slopes of hills and road sides of Bahgarah.

Distribution: INDIA [E & S India]; NEPAL, BHUTAN, MYANMAR, THAILAND, CHINA and VIETNAM.

Uses: Whole plant is used as antihypertensive.

Selaginella semicordata (Wallich ex Hooker et Greville) Spring in Mart. Fl. Bras 1(2):122.1840; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 28. 1982. *Lycopodium semicordatum* Wallich ex Hooker et. Grev. in Hook. Misc. Bot.2: 396. 1831.

Terrestrial. Stem spreading, slender, procumbent, branched with related dichotomy; rhizosphores arising from forkings. Leaves spirally arranged, oblique, lanceolate, entire, membranous. Strobili upto 0.6 cm long; sporophylls lanceolate-acuminate, ciliate at base, dentate at the apex. Sporangia oval, orange in colour; spores oval, dark brown.

Sporulation: August – December.

Exsiccatus: North Guwahati, *PC Kalita 0224*, dated 20.10.2013.

Habitat: Common, in shady damp localities and road sides of North Guwahati.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Tripura, Sikkim and Bihar]; BURMA, BANGLADESH and PENINSULAR MALAYSIA.

Uses: The whole plant is grinding and applied in wounds, cuts, etc. and possesses antiseptic properties especially in NE India.

EQUISETACEAE

Equisetum diffusum D. Don, Prodr. Fl. Nepal 19. 1825; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 29. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 78. 2005.

A small herbaceous, creeping and erect in aerial branches upto 40 cm tall infertile branches, the sterile ones upto 20 cm long, branched, internodes 1.5cm long, 8-ridges and grooves; branches whorled at nodes; sheaths loose upto 1 cm long, linear, entire. Strobilus stalked, upto 4cm long; spores reddish.

Sporulation: December – April.

*Exsiccatu*s: Madankuri, *PC Kalita 0155*, dated 20.01.2013.

Habitat: Occurrence in wet sandy soils along stream sides, river banks and muddy soils of Madankuri River.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, West to East Himalaya]; NEPAL, BHUTAN, MYANMA and CHINA.

Uses: The plant stem juice is given for gonorrhoea. Root juice is given in urinary troubles, sprains, fractures, burn and scabies.

OPHIOGLOSSACEAE

Helminthostachys zeylanica (Linnaeus) Hooker, Gen. Fil.t. 47.1840; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 32. 1982. *Osmunda zeylanica* Linnaeus, Sp. Pl. 1519. 1753.

Terrestrial. Erect herbs upto 65 cm tall. Rhizomes creeping, fleshy, glabrous; roots fleshy. Stipe upto 40 cm long, base covered with membranous sheath scales. Sterile segments palmifide, lobes 7-11; veins free, simple dichotomous. Fertile segment representing a terminal spike, stalk upto 15 cm long, glabrous, fleshy; spike upto 12 cm long, linear-subulate. Sporangia borne superficially on the spike, numerous; spores globose, dark; exine verrucoid.

Sporulation: June – August.

*Exsiccatu*s: Madan Kamdev, *PC Kalita 0015*, dated 04.07.2012.

Habitat: Rare, in foot hill slopes and in moist shady humus covered forest floor of Madan Kamdev foot hill. One of the threatened species in the State.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Central and Eastern Himalayas, Kerala, Tamil Nadu and Karnataka]; INDO-MALAYSIA and AUSTRALIA.

Uses: Fresh fronds are eaten as vegetable and also used as tonic in the treatment of wounds.

Ophioglossum reticulatum Linnaeus, Sp. Pl. 1063. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 33. 1982.

Terrestrial. Rhizome short. Roots numerous. Stipe erect upto 9cm long, slender. Sterile leaf like segment single on the middle of the frond, ovate- acute, spatulate- cordate, 2-3x1.2cm, sub-membranous, veins reticulate. Fertile segment erect, bearing terminally a 2.5cm long spike; peduncle upto 5cm long, slender; sporangia globose; spores oval.

Sporulation: September – December.

*Exsiccatu*s: Agdala, *PC Kalita 0095*, dated 10.11.2012.

Habitat: Occasionally found, on moist sandy soils and shady localities along grasses of Agdala.

Distribution: INDIA [Assam and Meghalaya]; PANTROPICAL, TROPICAL AFRICA, SOUTH AFRICA and MADAGASCUR.

Uses: Fresh fronds are eaten as vegetable and also used as tonic in the treatment of wounds. The rhizome is treated lung and heart diseases and also used to control uterine hemorrhage, leucorrhoea and headache or migraine.

MARATTIACEAE

Angiopteris crassipes Wallich ex C. Presl, Tent. Pterid. Suppl. 23. 1845; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad.1: 397. 2005. *Angiopteris evecta* (Forster) Hoffmann,

Comm. Soc. Reg. Goott. 12:29, t.5.1796; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 34. 1982.

Terrestrial. Caudex erect, massive starchy, short, above the ground, stipules just at the base of the stipe. Fronds very huge, tufted, ovate-lanceolate, bipinnate; stipes upto 100 cm long, thick, fleshy and white pale; pinnae upto 65 cm, subopposite to alternate, stipicellus sessile, swollen at base, lamina elliptic-oblong, acuminate; pinnules alternate or subopposite 9-24x 1.0-2.2cm, sessile, oblong-lanceolate, base truncate-cuneate, acuminate; costules with hairs on lower surface; veins forked into margin, prominent. Sori short and submarginal, composed of double row of sporangia born on a receptacle; sporangia superficial and sunken in lamina tissue; spores globose, trilete, smooth or alveolate.

Sporulation: August – December.

Exsiccatus: Borpahar, *PC Kalita 0085*, dated 20.10.2012.

Habitat: Growing on foot hill slopes, banks of the streams along road cuttings inside the forests of Borpahar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur and hilly regions of South India]; NEPAL, BHUTAN, MYANMAR, MALAYESIA, POLYNESIA, VIETNAM, CHINA, JAPAN, NEW CALEDONIA, MADAGASCAR and AUSTRALIA.

Uses: Leaves are used as head-dresses. Leaf extract and spores are used in the treatment of dysentery, ulcers, leprosy and skin diseases.

GLEICHENIACEAE

Dicranopteris linearis (N. Burman) Underwood in Bull. Torrey Bot. Cl. 34: 249. 1907; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 40. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 313. 2005. *Polyodium lineare* N. Burm., Fl. Indica: 235.t.67.f. 2. 1768.

Terrestrial. Rhizomes creeping. Fronds large; stipes long, stout, brown, dichotomously forked accessory branched present, lanceolate; ultimate-pinnae lanceolate, acuminate, base unequal; ultimate lobes oblong, entire and incurved, obtuse. Sori round, sub-basal to round; spores trilete, hyaline.

Sporulation: April – August.

Exsiccatus: Gopeswar pahar, *PC Kalita 0183*, dated 10.07.2013.

Habitat: Common, in the foot hill slopes and streams sides along forest margins of Gopeswar pahar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, West Bengal, Sikkim, Jambu and Kashmir and Himachal Pradesh]; TROPICAL and SUBTROPICAL ASIA, AFRICA, MALAYSIA, AUSTRALIA and POLYNESIA.

Uses: Fresh frond juices are internally used during throat pain, asthma, as an ingredient for making local beverages. Rachis is used for making mats, chairs, seats, pouches, caps, baskets, belts, etc.

LYGODIACEAE

Lygodium flexuosum (Linnaeus) Swartz in Schrard. Journ.2: 106. 1801; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 37. 1982; Jamir & Rao, Fern Nagaland, 136. 1988. *Lygodium scandens* Linnaeus Swartz *p.p.* Torrey Bot. Cl. 6(4): 280. 1899; Singh & Panigrahi,

Ferns and Fern-Allies Aruna. Prad.1: 388. 2005. *Ophioglossum flexuosum* Linnaeus, Sp.Pl. 1063. 1753.

Terrestrial, climbing. Rhizomes creeping, glabrous. Fronds glabrous, fertile fronds unipinnate; pinnae often 3-lobed or variously clefted at the base, terminal lobe elongate, linear-oblong; sterile fronds like the fertile ones, occupy the terminal portion, margin of the pinnae serrulate, often clefted at the apex. Sori protruding from the margin of the pinnules.

Sporulation: April – August.

Exsiccatus: Madan Kamdev, *PC Kalita, 0004* dated 20.04.2012.

Habitat: Growing on shady and moist rock crevices in the foot hills along road side cuttings of Madan Kamdev.

Distribution: INDIA [Assam, West Bengal, Dehradun, Kerala, Madhya Pradesh and Tamil Nadu]; SRI LANKA, INDONESIA, THAILAND, MALAYSIA, NEWGUINEA, PHILIPPINES, N.W. AUSTRALIA, CHINA and YUNNAN.

Uses: The whole plant is used as herbal medicine in the treatment of various ailments like jaundice, dysmenorrhea, wound, gonorrhea, scabies, healing and eczema. Rachis of the plant tied over forehead to reduce headache.

Lygodium japonicum (Thunberg) Swartz in J. Bot. 1800(2): 106. 1801; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad.1: 389. 2005. *Ophioglossum japonicum* Thunberg, Fl. Jap.:328. 1784.

Terrestrial, climbing on trees. Rhizomes long-creeping. Fronds upto 300cm; rachis, dorsal surface pubescent; pinnae the fertile fronds quadripinnate, ovate-deltoid and sterile fronds tripinnate; primary rachis-branches pubescent, brown and pointed; secondary rachis-branches in fertile frond tripinnate, pubescent and in sterile frond pinnate, secondary or tertiary rachis articulate, ovate or deltoid- lanceolate, margin in sterile frond crenate and deeply cleft to midvein in fertile; lamina pubescent, blackish-brown when dried; sporangia solitary; spores colliculate.

Sporulation: April – December.

Exsiccatus: Bahgarah, *PC Kalita 0218*, dated 20.09.2013.

Habitat: Growing in moist places in the forest margins of Bahgarah.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Mizoram, Nagaland, Manipur and South India]; SRI LANKA, THAILAND, MALAYA PENINSULA, MALESIAN ISLANDS, VIETNAM, CHINA, JAPAN, PHILIPPINES and AUSTRALIA.

Uses: Decoction of fertile fronds is used as diuretic and cathartic.

MARSILEACEAE

Marsilea minuta Linnaeus, Mant. 308.1771; Prain, Beng. Pl. 2: 1266. 1903.

Aquatic. Stem thin, creeping rhizome growing on the surface or slightly embedded in the mud, internodes long or short and there are two alternate rows or erect leaves along the upper side. Mature leaves show a long petiole on which there are four leaflets; sporocarps are stalked, bean shaped and are heterogenous.

Sporulation: December – March.

Exsiccatus: Madankuri, *PC Kalita 0350*, dated 20.02.2014.

Habitat: Common, in muds or on water covered with muds of Madankuri.

Distribution: INDIA [Assam, Meghalaya and West Bengal]; TROPICAL AFRICA and ASIA.

Uses: young fronds are eaten as vegetable and also used against insomnia and mental problem.

SALVINIACEAE

Azolla pinnata R. Brown in Prodr. 167. 1810; Prain, Beng. Pl. 2: 1266. 1903; Jamir & Rao, Fl. Nagaland 405. 1988; Borthakur *et al.*, Illust. Man. Ferns Assam 446. 2001.

Aquatic. Free-floating fern frond in ditches and ponds. Sporophyte with horizontal rhizome. Rhizome thin, delicate and floats horizontally on the water surface. Leaves born in two alternately overlapping rows on the rhizome. Sporocarps are borne on the lowermost leaf of a lateral branch. Sporocarp, contain both micro and mega sporangium.

Sporulation: May – August.

Exsiccatum: Singarpara, *PC Kalita 0016*, dated 08.07.2012.

Habitat: Common, in stagnant water bodies like ponds, pools and swamps of Singarpara area.

Distribution: INDIA [Assam and West Bengal] and TROPICAL ASIA.

Uses: Plants are widely used as green manure in the horticulture as well as in the paddy fields.

Salvinia cucullata Roxburgh *ex* Bory in C.P. Belanger, Voy. Bot. 2: 6. 1833; Prain, Beng. Pl. 2: 1265. 1903; Borthakur *et al.*, Illust. Man. Ferns Assam 446. 2001.

Aquatic. Free floating, horizontal and branched rhizome with hairs. Leaves sessile or shortly stalked, dimorphic, arranged in whorls at the nodes. Sporocarps borne terminally in cluster, globose on submerged leaves. Around 55 sporocarps in two rows, first 2-3 with macrosporocarp and rest with microsporocarp.

Sporulation: May – December.

Exsiccatum: Bezera, *PC Kalita 0107*, dated 20.11.2012.

Habitat: Endemic to North East India and Myanmar. Growing in ponds and shallow water bodies of Bezera area.

Distribution: INDIA [Assam and West Bengal and Endemic to NE. India] and MYANMAR.

Uses: Plant used as green manure.

Salvinia natans (Linnaeus) Allioni, Fl. Pedem.2:289.1785; Jamir & Rao, Ferns Nagaland, 406. 1988; Borthakur *et al.*, Illust. Man. Ferns Assam 449. 2001. *Marsilea natans* Linnaeus, Sp. Pl. 2: 1099. 1753.

Aquatic. A free floating fern. Rhizomes small, clothed with hairs, roots absent, horizontal; floating leaves 0.8-1.5x 0.5-1cm, small, oval-oblong; papillate on upper surface with 4-free hairs on the tip of each papilla; submerged leaves root-like, upto 5cm long, 4-8 in cluster, globose or ovoid, brown, with hexagonal wall cells; sporocarps containing megasporangia and others microsporangia.

Sporulation: May – December.

Exsiccatum: Bathan, *PC Kalita 0104*, dated 20.11.2012.

Habitat: Common in ponds, paddy fields and stagnant water bodies of Bathan.

Distribution: INDIA [Assam, Meghalaya, Nagaland and West Bengal]; EUROPE, AFRICA, ASIA, JAPAN and RUSSIA.

Uses: Plant is used as green manure.

LINDSAEACEAE

Odontosoria chinensis (Linnaeus) J.E. Smith in Seem. Bot. Voy. Herald: 430. 1857; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad.1: 365. 2005. *Trichomanes chinense* Linnaeus, Sp. Pl. 2: 1099. 1753.

Terrestrial. Rhizomes short, erect, paleaceous; roots profuse; paleae basifixed, narrow like hairs, entire. Fronds upto 55cm, tufted, tri-quadripinnate, oblong-lanceolate; stipes 5-20cm long, stramineous, paleaceous at base, smooth upwards; rachis similar; lamina upto 35cm; pinnae alternate, stipicellus, lanceolate or ovate-lanceolate, ascending, bipinnate, acuminate; pinnules upto 3 cm, anadromous, stipicellulus, winged; lamina oblong-deltoid, acroscopic, base truncate; ultimate-lobes wide, oblong-rectangular, entire, truncate, outer margin toothed. Sori marginal, terminal, cup-shaped, indusium thick; spores reniform, brown.

Sporulation: May – December.

Exsiccatus: Mandakata, PC Kalita 0225, dated 20.10.2013.

Habitat: Lithophytic pendent fern along drier places with grasses in the foot hill slopes in Mandakata.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and Sikkim]; NEPAL, BHUTAN, MYANMAR, THAILAND, VIETNAM, CHINA, TAIWAN, JAPAN, MALAYA PENINSULA, MALESIAN ISLANDS, MADAGASCAR and POLYNESIA.

Uses: Plants are used in chronic enteritis.

DENNSTAEDTIACEAE

Microlepia speluncae (Linnaeus) T. Moore, Ind. Fil. XCII. 1857; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 92. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad.1: 268. 2005. *Polypodium speluncae* Linnaeus, Sp.Pl. 1555. 1753.

Rhizome short, stout, creeping, densely hairy. Stipe erect upto 50 cm long, sparsely hairy. Lamina tripinnate upto 70cm long, sparsely hairy. Secondary pinnae lanceolate upto 25x10cm, short stipitate; tertiary pinnae sessile, lanceolate, pinnatifid at apex; pinnules oblong, margin deeply lobed, base decurrent on rachis. Costae and costules hairy on both surfaces. Sori submarginal on the lobes. Indusia elliptical to cup-shaped, hairy at base, margin finely lobed. Spores yellowish-brown.

Sporulation: July – December.

Exsiccatus: Borphar, PC Kalita 0250, dated 20.11.2013.

Habitat: Common, in foot hill slopes and also shady moist forest floors of Borphar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh], POLYNESIA, AMERICA, JAPAN, INDONESIA, COLMBIA and THAILAND.

Uses: Agri-horticulture: weeds and parasites.

PTERIDACEAE

Adiantum capillus-veneris Linnaeus, Sp. Pl. 2: 1096. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 142. 1982; Jamir & Rao, Fl. Nagaland 159. 1988; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 84. 2005.

Terrestrial. Rhizome short, creeping, hairy. Fronds 10-18x3-5cm, distant, solitary, bipinnate, ovate-lanceolate to decompose, spreading, firm, glabrous; glaucous green; pinnules shortly stalked, fertile 2-notched. Sori large marginal, single or double at the apex of the pinnule-lobes; spores trilete, light brown.

Sporulation: June – November.

Exsiccatus: Bahgarah, *PC Kalita 0218*, dated 20.09.2013.

Habitat: Common, in road sides as well as in slopes of foot hills in Bahgarah.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and mountainous regions of the country]; AMERICA, MEXICO, EURASIA, WESTERN ASIA, COLUMBIA and AFRICA.

Uses: The plant is used internally for rheumatism. It is also smoked to treat mental illness.

Adiantum caudatum Linnaeus, Mant. Pl. 308. 1771; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 142. 1982; Jamir & Rao, Fl. Nagaland 162. 1988.

Terrestrial. Rhizome short, creeping, covered by stiff roots and dark brown hair like linear scales. Lamina unipinnate and apical lamina not pinnae like, terminating into slender axis bearing proliferating vegetative buds. Sori reniform to slightly elongated on the apical margin of pinnae lobes.

Sporulation: June – October.

Exsiccatus: Madan Kamdev, *PC Kalita 0185*, dated 20.07.2013.

Habitat: Common, in road sides and hill slopes along stones of Madan Kamdev.

Distribution: INDIA [Assam, Meghalaya and Kerela]; PHILIPPINES, TROPICAL AFRICA, ASIA to POLYNESIA.

Uses: The leaf is used in skin diseases, diabetes, cough and fever

Adiantum philippense Linnaeus, Sp. Pl. 2: 1094; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 142. 1982; Jamir & Rao, Fl. Nagaland 162. 1988; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 86. 2005.

Terrestrial. Rhizome erect, short, paleaceous, densely clothes with stiff roots. Stipe and rachis purplish black, shining, glabrous. Fronds tufted, pinnate, oblong-lanceolate, obtuse; pinnae alternate, stipicellus, cuneiform to reniform. Sori marginal, dark brown; spores trilete, tetrahedral, dark brown.

Sporulation: April – December.

Exsiccatus: Madan Kamdev, *PC Kalita 0251*, dated 20.11.2013.

Habitat: Frequent, in rock crevices along hilly road sides in Maden Kamdev.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh]; BANGLADESH, THAILAND and COMBODIA.

Uses: Roots are used in the treatment of cough, leprosy, hair falling, asthma, bronchitis, epilepsy and ulcers.

Ceratopteris thalictroides (Linnaeus) Brongniart, Bull. Sci. Soc. Philom. 1821: 186. 1822; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 148. 1982; Jamir & Rao, Fl. Nagaland 179. 1988; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 430. 2005. *Acrostichum thalictroides* Linnaeus, Sp. Pl. 2: 1070. 1753.

Aquatic or inhabiting swampy places. Rhizomes short, erect, roots fibrous, annual, short leaved. Fronds dimorphic, tufted, herbaceous; sterile fronds upto 40 cm, lanceolate to ovate, lobed or pinnatifid to bipinnatifid, alternate; stipes upto 25 cm long; lamina either uniform or widest above the base, ovate, obtuse, dirty green; fertile fronds upto 60 cm long, simple to quadripinnate, linear-lanceolate to deltoid, acute to acuminate; stipes upto 30 cm long; lamina stalked, ovate to deltoid, acute to acuminate; ultimate-lobes, linear straight to falcate, acute. Sporangia dorsal, solitary on the lateral veins, sessile, hyaline; spores trilete, brown.

Sporulation: May – November.

Exsiccatus: Bathan, *PC Kalita 0103*, dated 20.11.2012.

Habitat: Common, in marshy places as well as aquatic in fresh water bodies of ponds and beels in Bathan.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and West Bengal]; NEPAL, SRI LANKA, MYANMAR, THAILAND, VIETNAM, AFRICA, CHINA, JAPAN PANTROPICS and SUBTROPICS.

Uses: The whole plant is used as green manure in the rice fields. The fronds are used as poultice for skin problems as a toxic and styptic to stop bleeding.

Onychium siliculosum (Desvaux) C. Christensen, Ind. Fil. 20. 1905; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 146. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 619. 2005. *Pteris siliculosa* Desvaux, Naturforsch. Freund. Berl. Mag.5: 324. 1811.

Terrestrial or rocky places. Rhizomes erect or very short, ascending, brown; roots soft, profuse; paleae nasal, lanceolate, entire, long acuminate, pale brown on rhizome and base of the stipe. Fronds upto 75x20 cm, tufted, deltoid to lanceolate, tripinnate to quadripinnate, sterile fronds more dissected; fertile fronds ovate-lanceolate; stipes upto 35cm long, paleaceous at base, stramineous to brownish tinged, grooved; lamina upto 25 cm; pinnae lowest pair the largest 15x8cm, alternate, stipicellus, ascending, deltoid, narrow at base, acuminate crenate; pinnules basal pair the largest, stipicellus, oblique-deltoid, pinnate to bipinnatifid, acuminate to caudate acute. Sori terminally on the fertile fronds, marginal, elongated, entire, indusium whitish pale, waxy powdery yellow or golden, opening at maturity; spores trilete, dorsal surface elongated reticulum, ventral surface smooth, light pale.

Sporulation: August – December.

Exsiccatus: Borphar, *PC Kalita 0256*, dated 20.11.2013.

Habitat: Occasionally found, on sandy or rocky exposed loose soil places and in slopes of hills along stream sides of Borphar.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, Western to Eastern Himalayas]; NEPAL, BHUTAN, MYANMAR, VIETNAM, CHINA, TWIWAN, MALAYA ISLANDS, PHILIPPINES, NEW GUINEA and POLYNESIA.

Uses: Decoction of fronds is used in dysentery. The whole herb paste mixed with honey given for treatment of sexual weakness. Rhizome juice is given to relieve fever.

Pityrogramma calomelanos (Linnaeus) Link, Handb. d. Gewachse 3: 20. 1883; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 146. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 326. 2005. *Acrostichum calomelanos* Linnaeus, Sp. Pl. 2: 1072. 1753.

Lithopytic fern. Rhizomes erect, short, decumbent ascending; scales lanceolate, slender; roots profuse. Fronds tufted on rhizomes, upto 80cm long, lanceolate, oblong, bipinnate to tripinnatifid, acuminate to caudate; stipe and rachis blackish or dark purple; lamina upto 40cm long; pinnae 4-8x1.0-3.5cm, basal pinnae slightly reduced, lanceolate; pinnules sessile, oblique-lanceolate; veins forked, free into margin; lower surface covered with white powdery; upper surface lustrous. Sori scattered, sessile on lower surface on veins and along midvein; spores trilete, shining brown, beautiful.

Sporulation: May - October.

Exsiccatu: Gopeswar pahar, *PC Kalita 0180*, dated 10.07.2013.

Habitat: Common, in exposed places along rocky sandy soils or in crack of rocks or artificial cliff caused by old mining activity in Gopeswar pahar.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Tripura, Mizoram, West Bengal, Bihar, Jharkhand, Orissa, Sikkim, Uttar Pradesh, Madhya Pradesh, Punjab, Rajasthan, Andhra Pradesh, Telangana, Kerala and Goa]; BHUTAN, BANGLADESH, NEPAL, SRI LANKA PAKISTAN, MYANMAR, EUROPE, SOUTH and CENTRAL AMERICA, SOUTH AFRICA and SURINAM.

Uses: The plant is used in traditional medicine as anti-hypertensiv, anti-pyretic, fever and in kidney troubles. Rhizomes and leaves are also used in anthelmintic and cold problems.

Pteris baurita Linnaeus, Sp. Pl. 2: 1076. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 110. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 569. 2005.

Rhizomes short, erect, thick, densely hairy and scaly; scales dark brown, linear-lanceolate. Fronds upto 70x30cm, unipinnate, ovate to ovate-lanceolate, bipinnatifid, caudate acuminate; stipes and rachis glabrous; lamina upto 50cm long; pinnae alternate, gradually reducing in upwards, sessile or very shortly stalked, oblong-lanceolate, long acuminate, entire, ; veins prominent, forming an arch forked, 12-16 pairs. Sori marginal, elongated pteroid type interrupted at sinus and apex of lobes, indusium thick, light pale, entire.

Sporulation: April – August.

Exsiccatu: Madan Kamdev, *PC Kalita 0195*, dated 20.07.2013.

Habitat: Common, in shady situation, road sides along slopes of hills in Madan Kamdev.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh]; THAILAND, TROPICS and SUBTROPICS.

Uses: The plant is beneficial in antioxidant activity. The plant can defend itself against microbial attack.

Pteris cretica Linnaeus, Mant. Pl. 130. 1767; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 110. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 574. 2005.

Terrestrial. Rhizome short-creeping, paleaceous at apex; roots many, firm; paleae basifixed, oblong-lanceolate, entire, long acuminate, brown-dark brown. Fronds upto 80cm long, ovate to obovate, caudate acuminate, pinnate dimorphic; stipes upto 60 cm long, grooved, dark brown towards base, stramineous upwards, grooved smooth; lamina upto 35 cm long; pinnae 12-16x1.2-2cm, sessile, base decurrent, basal bipartite, lanceolate, strongly crenate-serrate, undulate, acuminate, subopposite, sessile, linear-lanceolate, entire or undulate; veins prominent, thick, simple, in sterile pinnae ending before margin into lanceolate hydathode, both surfaces club-shaped, brown or white, coriaceous. Sori marginal, elongated, indusium thick, white pale, subentire, globular; spores trilete, brown.

Sporulation: May - November.

Exsiccatus: Kamal pur, *PC Kalita 0190*, dated 20.07.2013.

Habitat: Common, in road sides as well as shady places of Kamal pur.

Distribution: INDIA [Assam, Arunachal Pradesh and Meghalaya]; HOWAI, CHINA, JAPAN, INDONESIA THAILAND, VIETNAM and AFRICA.

Uses: The fronds are antibacterial which are made in to a paste and applied in wounds.

Pteris ensiformis N. Burman, Fl. India 230. 1768; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 110. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 576. 2005.

Terrestrial or lithophytes. Rhizome short creeping; roots many; paleae basifixed, subulate-lanceolate, entire, acuminate, pale brown. Fronds dimorphic, pinnate to bipinnate; sterile upto 23x7cm; stipes upto 10 cm long; lamina 10cm long; pinnae, sessile to subsessile, deltoid, lanceolate, serrate, acute; fertile 40x20cm, ovate-lanceolate, caudate acuminate; stipes 25cm long, stramineous, grooved, glabrous; lamina upto 30 cm long; pinnae 12x2.5cm, sessile to subsessile, deltoid-lanceolate, entire, acuminate; pinnules sessile, elliptic oblong, serrate, obtuse; veins 1-2 forked, lanceolate hydathode, herbaceous. Sori confluent, marginal, elongated, indusium pale, subentire, thick; spores trilete, dark brown.

Sporulation: April – July.

Exsiccatus: Borpalah, *PC Kalita 0179*, dated 10. 07.2013.

Habitat: Common, in moist sandy soils as well as shady places in the road sides of Borpalah.

Distribution: INDIA [Assam, Arunachal Pradesh and Meghalaya]; SRI LANKA, NEPAL, BHUTAN, BANGLADESH, MYANMAR, CHINA, JAPAN, PHILIPPINES, MALAY PENINSULA, TROPICAL AUSTRALIA and POLYNESIA.

Uses: The young fronds are eaten as a flavoring, decoction of fresh frond is given dysentery, juice of rhizome is applied to glandular swelling of the neck.

Pteris vittata Linnaeus, Sp. Pl. 2: 1074. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 111. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 605. 2005.

Terrestrial or rock-crevices. Rhizomes suberect, creeping, densely hairy, roots firm; paleae basifixed, subulate-lanceolate, entire, acuminate, pale. Fronds upto 40-70 x 15-20 cm, tufted, oblanceolate, caudate acute, pinnate; stipes upto 12 cm long, light pale brown; rachis similar; lamina upto 60cm long ;pinnae 12x0.6cm, sessile, elongate, linear, deltoid-cordate at base, serrulate, acute to obtuse, largest pinnae in apical, gradually reduced downwards to the base; veins simple to twice forked. Sori marginal, continuous, indusium entire, thick, pale brown; spores trilete, round, bright brown.

Sporulation: May – July.

Exsiccatus: Mandakata, *PC Kalita 0169*, dated 10. 06.2013.

Habitat: Common, in road sides and rock-crevices in open places of Mandakata.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya and throughout the country]; NEPAL, CHINA, SRI LANKA, THAILAND, MALAYSIA, PHILIPPINES, JAPAN, AUSTRALIA, CALIFORNIA and SOUTH AFRICA.

Uses: Plant extract is used as demulcent, hypertensive, antiviral, antibacterial and tonic.

Pteris wallichiana J.G. Agardh, Rec. Spec. Gen. Pterid. 69. 1839; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 111. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 608. 2005.

Rhizome erect, short, thick; paleae basifixed, lanceolate, pale brown. Fronds upto 100x50cm, irregularly branched, deltoid, bipinnate; stipe erect upto 70cm long, glabrous, purple or blackish brown, slender; lamina 50cm, bipinnatifid bearing pinnae, sessile or stalked, rachis blackish brown, trichotomously forked at base bearing two lateral pinnae and one terminal pinna. Sori marginal, elongated; indusium elongated; paraphyses pale with terminal cell globular; spores light brown.

Sporulation: May – August.

Exsiccatus: Bormula, *PC Kalita 0012*, dated 10.06.2012.

Habitat: Common, in road sides along foot hills of Bormula.

Distribution: INDIA [Assam, Arunachal Pradesh and Meghalaya]; NEPAL, BHUTAN, CHINA, MYANMAR, JAVA, JAPAN, PHILIPPINES and SAMOA.

Uses: Fresh leaves are medicinal. It is crushed and applied to stop bleeding and healing of wounds.

ASPLENIACEAE

Asplenium nidus Linnaeus, Sp. Pl. 2: 1079. 1753; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 115. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 109. 2005.

Large epiphytic fern. Rhizome short, creeping, thick, stout; roots profuse, forming a compact network with moss; paleae basifixed, lanceolate, dark brown. Fronds 30-70x6-10cm, sessile to winged stipe upto 4cm long; lamina lanceolate-elliptic, alternate, entire, acuminate; rachis prominent below, light green, coriaceous; sori oblique, elongated, indusium entire, thick, pale; spores brown.

Sporulation: December – April.

Exsiccatus: Madan Kamdev, *PC Kaita 0300*, dated 20.01.2014.

Habitat: Common, on the tree trunks of *Samanea saman* and *Ficus religiosa* in Madan Kamdev.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and mountainous regions of the country]; NEPAL, AFRICA, BHUTAN, SRI LANKA, MALAYA, MADAGASCAR, TAIWAN, PHILIPPINES and POLYNESIA.

Uses: Root stock is considered effective against fever and elephantiasis. It is used as an emollient, in cough and diseases of the chest. Leaf is smoked to treat colds.

THELYPTERIDACEAE

Cyclosorus dentatus (Forsskal) Ching in Bull. Fan Mem. Inst. Biol. Bot. 8: 206. 1938; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 675. 2005. *Polypodium dentatum* Forsskal, Fl. Aegypt.-Arab. 185. 1773.

Rhizomes decumbent, paleaceous. Fronds tufted, elliptic, caudate acuminate, bipinnatifid; stipes 20cm long, grooved, paleaceous at base, hairy on both surfaces. Lamina 40cm long; pinnae upto 18 pairs, oblong-lanceolate, narrowed from base, gradually acuminate, dentate, veins forked in larger lobes, hairs on both surfaces; pinnae lobes oblong, entire, obtuse; veins

7-9 pairs. Sori round, indusium reniform, dense hairs on surface; sporangium stalked with hairs; spores reniform, brown in colour.

Sporulation: July – December.

Exsiccatus: Borpahar, *PC Kalita 0211*, dated 10.09.2013.

Habitat: Common, in the foot hill slopes as well as humid places of Borpahar.

Distribution: INDIA [Assam, Arunachal Pradesh and West and East Himalayas]; AMERICA, TROPICAL and SUBTROPICAL Countries.

Uses: Leaf extract possesses antibacterial activities.

Cyclosorus jaculosus (Christ) H. Ito in Bot. Mag. Tokyo 51: 725.f.4. 1937; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 685. 2005. *Aspidium jaculosum* Christ in Bull. Boiss. II, 4: 615. 1904.

Rhizomes erect to creeping; paleae basifixed, ovate-lanceolate, brown. Fronds elliptic, caudate acuminate, bipinnatifid; stipes 20cm long, acicular hairy throughout; lamina 130 cm long; pinnae sessile, oblong-lanceolate, gradually acuminate, long acicular hairy throughout like rachis; pinnae-lobes broad oblong, entire; veins 5-8 pairs, hairy. Sori brown, irregularly ridged.

Sporulation: August – December.

Exsiccatus: Gopeswar pahar, *PC Kalita 0071*, dated 20.09.2012.

Habitat: Common, in moist and shady places in the forests of Gopeswar pahar.

Distribution: INDIA [Assam, Arunachal Pradesh and Meghalaya]; THAILAND, TAIWAN, HONG KONG, CHINA and JAPAN.

Uses: The whole plant is used as green manure to banana.

Cyclosorus parasiticus (Linnaeus) Farwell in Amer. Midl. Nat. 12: 259. 1929; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 692. 2005. *Polypodium parasiticum* Linnaeus, Sp. Pl. 1090. 1753.

Terrestrial. Rhizomes long creeping. Fronds wide, distant, caudate acuminate, bipinnatipartite; rachis grooved dorsally, hairy; pinnae largest at the base of lamina upto 113x2.5cm, alternate, 20 pairs, oblong-lanceolate, base truncate, apex acuminate; costae grooved dorsally, hairy, hyaline, stiff; pinnae-lobes 3mm wide, oblong, entire, obtuse, oblique, sinus wide, midrib hairy on both surfaces; veins 10-12 pairs, simple or forked, ending into margin, hairy on both surfaces, margin hairy, drying pale, herbaceous. Sori round, median, indusium, reniform, large, densely hairy; sporangium stalk with glandular hair; spores monoletate, brown, irregular and tuberculated.

Sporulation: May – October.

Exsiccatus: Mandakata, *PC Kalita 0045*, dated 20.08.2012.

Habitat: Common, in open places along foot hill forests of Mandakata.

Distribution: INDIA [Assam, Arunachal Pradesh, S. India to East Himalayas]; SRILANKA, NEPAL, BHUTAN, BANGLADESH, MYANMAR, THAILAND, CHINA, VIETNAM, MALAYSIA, TAIWAN, JAPAN, AUSTRALIA, NEW CALEDONIA, FIJI, SAMOA, POLYNESIA, NEW ZEALAND and HAWAII.

Uses: The whole plants are used as folk medicines for the treatment of rheumatic pains.

Cyclosorus siamensis (Tagawa and Iwatsuki) Panigrahi in research J. Pl. Environ. 9: 67. 1993; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 702. 2005. *Thelypteris siamensis* Tagawa and Iwats. in Acta Phytotaxa. Geobot. 22: 101. 1967.

Terrestrial. Rhizomes erect, short, apex densely paleaceous; roots many; paleae basifixed, linear-subulate, entire, acuminate wrinkled, acicular hairs present on surface and margin, brown. Fronds upto 90x16 cm, tufted elliptic-lanceolate, caudate acuminate, bipinnatifid; stipes 40 cm long, grooved dorsally and laterally, hairy throughout, paleaceous at base; hairs acicular short to long on dorsal surface; rachis acicular hairy; lamina 50 cm long; pinnae 9.5x1.5 cm, widest at base and then narrowed; 16 pairs, sessile, lanceolate, subcaudate acuminate, base broad cunate; costae grooved dorsally, densely hairy on both surfaces; pinnae-lobes oblong, entire, obtuse, margin hairy; veins 7 or 8 pairs, excurent vein ending into short sinus membrane, acicular hairy on both surfaces. Sori round median to slightly nearer to midvein, indusium reniform, large, persistent, densely hairy on surface and margin; spores monolete, brown and irregularly tuberculate.

Sporulation: May – August.

Exsiccatus: North Guwahati, *PC Kalita 0008*, dated 20.05.2012.

Habitat: Common, in shady places along foot hill forest floors of North Guwahati.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, Manipur, Tripura and Nagaland]; THAILAND, CHINA and TAIWAN.

Uses: The species commonly used as herbal medicine for sores, liver trouble, gonorrhoea, cough and malaria.

BLECHNACEAE

Blechnum orientale Linnaeus, Sp. Pl.2: 1077. 1753; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad.1: 183. 2005.

Rhizomes erect, small, apex densely paleaceous; paleae basifixed, subulate-lanceolate, entire with very small projections, long acuminate, brown. Fronds up to 150x20-40cm, tufted, pinnate, caudate acuminate; stipes up to 40cm long, paleaceous at base, thick, stramineous, several pairs of small auricles present, grooved dorsally; lamina upto 100 cm long; pinnae upto 24x2cm, alternate, spreading, sessile to basiscopic margin adnate, linear-lanceolate, entire, gradually long acuminate, subfalcate, surfaces smooth abruptly reduced to the small auricles on the stipe; veins free, simple to usually once forked, forking very close to the costae, ending into margin, drying stramineous, subcoriaceous. Sori costal, elongated, indusium long, narrow, opening towards costae, brown; spores reniform, black brown.

Sporulation: April – August.

Exsiccatus: Bahgarah, *PC Kalita 0178*, dated 10. 07.2013.

Habitat: Common, in shady places as well as hill slopes or stream sides in exposed areas of Bahgarah.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya and subtemperate zone]; BHUTAN, NEPAL, BANGLADESH, SRI LANKA, MYANMAR, THAILAND, MALAYA, INDONESIA, MALESIA, CHINA, POLYNESIA and AUSTRALIA.

Uses: Rhizome edible and also used in urinary disorders.

Stenochlaena palustris (N. Burman) Underwood in Pfeiffer Nom. 2: 724. 1874; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 118. 1982; Singh & Panigrahi, Ferns and

Fern-Allies Aruna. Prad. 2: 614. 2005. *Polypodium palustre* N. Burman, Fl. Indica 234. 1768.

Terrestrial. Rhizomes high climbing, long creeping, thick, green, glabrous; clasping roots, hairy, profuse, spiral. Fronds upto 200x50cm, distant, oblong, pinnate, dimorphic, sterile and fertile; stipes upto 30cm long, upper surface green and lower surface chestnut colour, glabrous; pinnae dimorphic, alternate, articulated; sterile 12-22x3-4.5cm, oblong, base cuneate, margin mostly parallel, caudate acuminate; veins prominent on both surfaces, free or connate at margin, simple, serrate, spiny, surfaces glabrous; fertile 20-36x0.2-0.4 cm, stipe thick, lamina very narrow linear, acuminate, margin incurved, elongated. Sori acrostichoid, covering full length of lamina; spores bilateral, hyaline, reniform and tuberculated.

Sporulation: August – December.

Exsiccatus: Kamal Pur, *PC Kalita 0065*, dated 10. 09. 2012.

Habitat: Common, in shady localities along forest margins climbing large over *Albizia lucidior*, *Ficus religiosa* and bushes in Kamal Pur.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, West Bengal, Western Ghats, South India and Sikkim]; SRI LANKA, MALAYA, POLYNESIA, FIJI and AUSTRALIA.

Uses: The elongated aerial stem is used as rope to switching some domesticated items such as basket, chalani, kula, dola, jakoi, khaloi, cheap, etc. The leaves are used as remedies for fever, skin diseases, ulcers and stomachache.

ATHYRIACEAE

Athyrium drepanopterum (Kuntze) A. Brown ex Milde, Fl. Eur.: 49. 1867; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 128. 2005. *Polypodium drepanopterum* Kuntze in Linnaea 23: 278, 318. 1850.

Terrestrial. Rhizome erect, ascending, paleaceous at the apex; paleae basifixed, ovate-lanceolate. Fronds upto 50cm long, tufted, ovate-lanceolate, bipinnate to tripinnate; stipes upto 24cm long paleaceous and curved at base; lamina upto 40cm long; pinnae 15-24 pairs; pinnules sessile, deltoid-ovate, acute to both bases. Sori median, elonged or rounded, pale; spores bilateral, light greenish brown.

Sporulation: April - August.

Exsiccatus: Borpahar, *PC Kalita 0181*, dated 10.07.2013.

Habitat: Common, among rocks in humid places of Borpahar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and Southern India]; BHUTAN, CHINA, NEPAL, MYANMAR, TAIWAIN and PHILIPPINES.

Uses: Plants are used as food plants by the larve of some Lepidoptera species.

Diplazium dilatatum Blume, Enum. Pl. Javae 11: 194. 1828; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 153. 2005.

Terrestrial. Rhizomes erect, densely paleaceous, roost thick; paleae basifixed, linear-lanceolate, dark brown. Fronds tufted, large, ovate-lanceolate, bipinnate to tripinnate, caudate acute; stipes paleaceous towards base and very sparsely upwards, green; lamina upto 70cm long; pinnae, alternate, lanceolate-oblong, bipinnatifid, acuminate; pinnules catadromous, papillate or oblong-lanceolate, acumination serrate, base cordate; pinnule-lobes elliptic, glabrous. Sori indusium, lacerated and thin; spores reniform, light brown.

Sporulation: June – November.

*Exsiccatu*s: Borphahar, *PC Kalita 0017*, dated 10.07.2012.

Habitat: Common, in shady places along road sides and forest floors of Borphahar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh and Southern India]; MYANMAR, CHINA, THAILAND, MALESIA, MALESIA ISLANDS, TAIWAN, JAPAN, PHILIPPINES and HONG KONG.

Uses: The young fronds are used as vegetable.

Diplazium esculentum (Koenig ex Retzius) Swartz in Schrad. J. Bot. 1801(2): 312. 1803; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 140. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 161. 2005. *Hemionitis esculenta* Koenig ex Retzius in Obs.Bot. 6: 38. 1791.

Terrestrial. Rhizomes erect; paleae basifixed, subulate, toothed, acuminate, dark brown. Fronds upto 90cm, tufted, lanceolate, bipinnate with pinnatifid apex, caudate acuminate; stipes upto 35cm long, paleaceous at base, stamineous to muricate upwards; lamina upto 50cm long; pinnae upto 30cm, 11-16 pairs, lanceolate, acuminate, apex serrate; pinnules stipicellulus, sessile, adnate upwards, subulate, acuminate, crenate, pointed hairs on lower surface; veins 4-8 pairs. Sori medial, indusium thin, light brown; spores reniform, hyaline.

Sporulation: May – August.

*Exsiccatu*s: Borphahar, *PC Kalita 0014*, dated 12.06.2012.

Habitat: Common along the road sides, shady forest floors and also on the banks of streams in Borphahar area.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh]; MYANMAR, SRI LANKA, MALAYA, MALAYSIA, TAIWAN, PHILIPPENNES, NEW GUINEA and SAMOA (U.S.A.).

Uses: The Young fronds are collected and eaten as vegetable after cooking.

DRYOPTERIDACEAE

Polystichum discretum (D. Don) J.E. Smith in J. Bot. 3: 413. 1841; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 1: 295. 2005. *Aspidium discretum* D. Don, Prod. Fl. Nepal 4. 1825.

Terrestrial. Rhizome erect, paleaceous; paleae polymorphous, isotoechae, basifixed, linear, oblong-lanceolate. Fronds upto 80 cm, tufted, lanceolate, bipinnate, caudate- acuminate; stipes 30-40cm long, green, brownish, densely large paleaceous at base, sparsely minute pale upwards; rachis paleaceous; lamina upto 45 cm long; pinnae subopposite, ascending, 15-18 pairs; pinnules 13-16 pairs, subsessile, base cuneate, serrate spinescent, apiculate. Sori round, persistent; spores dark brown.

Sporulation: July – October.

*Exsiccatu*s: Borphahar, *PC Kalita 0178*, dated 10.07.2013.

Habitat: Growing in damp and moist places and also inside the forest floors of Borphahar.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, West Bengal and Bihar]; NEPAL, BHUTAN, PAKISTAN, MYANMAR and CHINA.

Uses: Used as food plants by the larve of some *Lepidospora* species.

POLYPODIACEAE

Drymoglossum heterophyllum (Linnaeus) Trimen in J. L. Soc. 24:152.1887; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 60. 1982. *Arostichum heterophyllum* Linnaeus, Sp. Pl. 2: 1067. 1753.

Epiphytes. Rhizomes wiry, compactly scaly; scales dark brown, ovate-peltate. Fronds glabrous, fleshy, membranous, shortly stipitate; stipe upto 2 mm long; veinlets, main vein not conspicuous. Sporangia in a continuous, linear-coenosori, medial, exindusiate, stellate, paraphyses present; annulus 14-18. Spores bilateral, densely covered with rhizome scale; sterile lamina 2.0-4.5x1.5-2.0cm, cuneate at base, rounded at apex, entire; fertile lamina 4-8x3-4cm, stellate palea adpressed throught the lamina. Sori linear, confluent along the tip of lamina; sporangia oval, shortly stalked, dark brown; spores oval to elliptic, hyaline, light brown.

Sporulation: April – August.

*Exsiccatu*s: Bormula, *PC Kalita 0011*, dated 12.06.2012.

Habitat: Common, creeping over tree trunks of *Ficus religiosa* and *Magnifera indica* in exposed areas and humus deposited rocks of Bormula.

Distribution: INDIA [Assam, Arunachal Pradesh, Meghalaya, Manipur, Tripura and West Bengal]; NEPAL, BHUTAN, BANGLADESH, MYANMAR and SRI LANKA.

Uses: Paste obtained by crushing pinnae applied externally in the form poultice on fractured bones after setting up the bones.

Drynaria propinqua (Wallich ex Mettenius) J.E. Smith in J. Bot. 4: 62. 1842; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 61. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 456. 2005. *Polypodium propinquum* Wallich ex Mettenius in Abh. Sench. Natur f. Ges. (Farngatt.) 2: 120. 1857.

Epiphytic, climbing. Rhizomes long creeping, thick, stout, paleaceous, roots thin; paleae peltate, ovate-lanceolate, long acuminate, margin hairy, brown. Fronds dimorphic; sterile 15-20x 12x16 cm, sessile, round or broadly ovate, pinnatifid; lobes oblong, entire, acute, rachis very stout, brown and thick, costae and all other veins prominent; fertile 20-45x15-22 cm, stipes upto 12 cm long, stout swollen at base, lamina ovate or slight elongated, lobes narrow at base, both margins run parallel most of the distance, caudate acute; costae thick; veins prominent. Sori round, basal large; paraphyses 2-celled, club-shaped, brown; spores bilateral, reniform, light brown.

Sporulation: April – August.

*Exsiccatu*s: Mandakata, *PC Kalita 0172*, dated 10.06.2013.

Habitat: Very common and large climbing fern, covering tree trunks of *Samanea saman* in the road sides of Mandakata.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Himalayas and Uttaranchal]; NEPAL, CHINA BHUTAN and MYANMAR.

Uses: The rhizome is commonly used to treat bone injuries.

Drynaria quercifolia (Linnaeus) J.E. Smith in J. Bot. 3: 398. 1841; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 61. 1982. *Polypodium quercifolium* Linnaeus, Sp. Pl. 1547. 1753.

Epiphytes. Rhizome creeping, fleshy, densely covered with dark roots and scales; scales linear, dark brown. Sterile frond 15-30x8-16cm, overlapping the base of the fertile fronds,

ovate, cordate at base, sessile, margin deeply lobed, entire, coriaceous, glabrous; fertile fronds pinnatisect upto 100cm long, slender stipitate; stipe up to 22cm long, glabrous; pinnae linear-oblong with acute apex, margin wavy. Fronds when young simple with undulating margin; veins reticulate, prominently raised. Sori small, globose, scattered throughout the surface of lamina in between lateral veins, dorsal, superficial along veinlets. Sporangia round, slender stalked; spores oval, hyaline, light brown.

Sporulation: May – August.

Exsiccatus: Madan Kamdev, *PC Kalita 0018*, dated 10.07.2012.

Habitat: Common, over tree trunks of *Phoenix sylvestris* and *Ficus religiosa* in exposed localities and old humus deposited brick walls and stones of Madan Kamdev foot hills.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Himalayas and Uttaranchal]; NEPAL, BHUTAN, INDONESIA, MALAYSIA, PHILIPPINES, NEW GUINEA, MYANMAR and AUSTRALIA.

Uses: The rhizome paste mixing with molasses taken internally during cardiac problem. It is used as antibacterial, anti-inflammatory tonic, typhoid fever, phthisis, dyspepsia, cough, artralgia, cephalalgia, diarrhea and ulcers. It is very specific in the migraine.

Leptochilus axillaris (Cavanilles) Kaulfuss, Enum. Fil. 1: 147.t.1.f.10. 1824; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 66. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 470. 2005. *Acrostichum axillare* Cavanilles in Ann. Hist. Nat. 1: 101. 1799.

Creeper or climbing fern. Rhizomes long creeping, firm, roots a few. Fronds dimorphic, slender stipitate; sterile fronds 15-30x2.5-3.2cm, stipe 1.2 cm long, elliptic, base equally decurrent upto the base, entire, acuminate, veins reticulate, several rows of arthrospores, venation clear, pale green; fertile fronds linear, upto 30x0.5-1cm, stipes 5-7cm long, lamina acute, lower surface covered with sori. Sori indusiate, covering full under surface. Spores elliptic, hyaline or pale green, smooth.

Sporulation: June – October.

Exsiccatus: Borpahar, *PC Kalita 0080*, dated 12.10.2012.

Habitat: Occasionally found as twinners on old walls or shady bolders in the forest, near water sources of Borpahar.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh]; TROPICAL ASIA, POLYNESIA, MYANMAR, CHINA, MALAYA and PHILIPPINES.

Uses: The plant is used as medicine in skin diseases.

Microsorium pteropus (Blume) Copeland in Uni. Calif. Publ. Bot. 16: 112. 1929; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 479. 2005. *Polypodium pteropus* Blume, Enum. Pl. Javae addenda 3: 1828.

Rhizomes wide creeping. Roots long, brown, dense hairs. Fronds 10-25x7-14cm; stipes 12cm long, without wing 32-4cm long, densely paleaceous; lamina upto 17 cm long, deltoid to rhomboid, trilobed, elliptic-lanceolate, entire, acuminate; rachis paleaceous; costate paleaceous; veins reticulate, irregular, 3-4 rows, veinlets simple, forked or branched, dark green. Sori rounded to oblong or different shapes; spores reniform to oval, light smooth.

Sporulation: July – October.

Exsiccatus: Borpahar, *PC Kalita 0259*, dated 20.11.2013.

Habitat: Lithophytic on rocks and exposed in stream sides or nala bathing regularly in Borpahar.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Sikkim, S. and N. India]; SRI LANKA, NEPAL, BHUTAN MYANMAR, MALAYA, S. CHINA, TAIWAN, VIETNAM and PHILIPAPINES.

Uses: It is used as a basic aquarium setup and ornamental plant.

Pleopeltis macrosphaera (Baker) Panigrahi & Patnaik in Proc. Nat. Acad.Sci. India 34: 481. 1964; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 511. 2005. *Polypodium macrosphaerum* Baker in Kew Bull. 55. 1895.

Epiphytes. Rhizomes short creeping, paleaceous; roots profuse; paleae peltate, ovate-elliptic, entire, obtuse, brown. Fronds 20-40x1.2-1.5cm, close; stipes upto 4cm long, glabrous, rachis sparsely paleaceous below; lamina linear-elliptic to elliptic-lanceolate, entire, long acuminate, lateral veins faint or clear, reticulated, 4-5 rows of irregular areoles, free veinlets, lower surface dirty brown. Sori round to elongated, on veinplexus, paraphyses brown, clathrate, long stalked, umbrella shaped; spores bilateral, reniform, hyaline, bluish-black, smooth.

Sporulation: May – August.

Exsiccatus: Borpahar, *PC Kalita 0200*, dated 20.08.2013.

Habitat: Growing on tree trunks of *Syzygium cumini* in the forest margins and road sides of Borpahar.

Distribution: INDIA [Assam, Meghalaya and Arunachal Pradesh] and CHINA.

Uses: The plant is used as medicine in cough and asthma.

Pyrrhosia flocculosa (D. Don) Ching in Bull. Chinese bot. Soc. 1: 66. 1935; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 75. 1982; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 533. 2005. *Polypodium flocculosum* D. Don, Prod. Fl. Nepal 1. 1825.

Epiphytic fern. Rhizomes short creeping; root profuse, hairy; scales linear, hair like apex. Fronds 20-35x2.5-5.5cm, closely originated; stipes teret, upto 16cm long, thick, stellate hairy; lamina lanceolate to elliptic-lanceolate, long acuminate, decurrent to distance on stipe, thickly coriaceous, woolly tomentose lower surface; veins obscure, veinlets simple facing margin. Sori globose, depressed, irregular throughout the surface; spores reniform, pale brown.

Sporulation: June – October.

Exsiccatus: Mandakata, *PC Kalita 0230*, dated 10.11.2013.

Habitat: Common, on shady tree trunks and also mossy rock surfaces in the forest margins of Mandakata.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Nagaland, Western and Eastern Himalayas]; NEPAL, BHUTAN, VIETNAM and CHINA.

Uses: The plant is used in cough and malaria.

Pyrrhosia heteractis (Mettenius ex Kuhn) Ching in Bull. Chinese Bot. Soc. 1: 57. 1935; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 75. 1982; Jamir & Rao, Ferns

Nagaland 94. 1988; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 535. 2005. *Polypodium heteractis* Mettenius ex Kuhn in Linnaea 36: 140. 1869.

Epiphytes. Rhizomes wide creeping, branched, paleaceous; roots distant; paleae pelctate, lanceolate, entire at base and hairy upwards, brown. Fronds upto 30x4.5cm; stipes upto 18 cm long, stellate hairy; lamina lanceolate to ovate-lanceolate, cuneate at base, caudate long acuminate, upper surface glabrous; lower surface with stellate hairs; veins drynarioid, several rows of areoles, veinlets directed towards rachis and margins. Sori globose, receptacles round to oblong, covered with stellate hairs; spores monoletate, pale to greenish pale, reniform.

Sporulation: June – September.

Exsiccatus: Mandakata, PC Kalita 0220, dated 10.10.2013.

Habitat: Frequent, in plains on tree trunks of *Syzygium cumini* in shady localities in the forest margins of Mandakata.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, Nagaland and Sikkim]; CHINA, BHUTAN and MYANMAR.

Uses: The plant is used in the problems of chronic bronchitis and bronchial asthma.

Pyrrrosia lanceolata (Linnaeus) Farwell in Amer. Midland. Nat. 12: 245. 1931; Singh & Panigrahi, Ferns and Fern-Allies Aruna. Prad. 2: 537. 2005. *Acrostichum lanceolatum* Linnaeus, Sp. Pl. 2: 1067. 1753.

Epiphytic ferns. Rhizomes wide-creeping; roots profuse. Fronds 5-10x1.5-4.0cm, sessile to stipes, elliptic to narrow lanceolate, base decurrent, entire, acute, upper surface pitted, lower surface covered with monomorphic stalked stellate-hairs with hyaline lanceolate arms; venation glands may be light brown, subcoriaceous. Sori globose, very close, sunk, covered with stellate-hairs with lanceolate arms; spores monoletate, greenish yellow to light brown, reniform, tuberculated.

Sporulation: July – October.

Exsiccatus: Kuruwa, PC Kalita 0253, dated 20.10.2013.

Habitat: Frequent, on the tree trunks of *Ficus religiosa* and *Magnifera indica* in the forest margins of Kuruwa.

Distribution: INDIA [Assam, Meghalaya, Arunachal Pradesh, West Bengal, Orissa, Sikkim and Kerala]; BHUTAN, SRI LANKA, CHINA, MALAYSIA, NEW GUINEA, TAIWAN and POLYNESIA.

Uses: The plant is used reducing of chronic diseases (tumour).

Pyrrrosia mannii (Giesenhagen) Ching in Bull. Chin. Bot. Soc. 1: 55. 1935; Baishya & Rao, Ferns & Fern-Allies Megha. State Ind. 75. 1982. *Niphobolus mannii* Giesenhagen, Farngett. Niph. 107. 1901.

Epiphytes. Rhizomes creeping with much fibrous roots, ramenta brown, dense; scales narrow lanceolate hairy. Fronds oblanceolate-acute, tapering at base, coraceous, greenish, gland-dotted above and finely covered with wooly-stellate tomentum beneath. Sori copius, arranged in series towards apex, dark brown; spores oval, yellow.

Sporulation: August – November.

Exsiccatus: Bormula, PC Kalita 0100, dated 12.11.2012.

Habitat: Common, on open tree trunks in the road sides and also old shaded walls of Bormula.

Distribution: INDIA [Assam, Arunachal Pradesh and Meghalaya] and TROPICAL Countries.

Uses: The plant is used as medicine for dieresis, clear heart and eliminates wetness.

RESULTS AND DISCUSSION

The present survey is based on extensive ferns and fern-allies collection made during April 2012 to March 2014 from different localities of Madan Kamdev Hill region and its adjoining areas on north bank of the river Brahmaputra, Kamrup district of Assam. A total of 50 ferns and fern-allies species belonging to 31 genera and 18 families are recorded from different habitats of the region. The area represents all types of habitat for suitable growth and distribution of ferns. All the way sides of forest and forest edges, hill tops, stream sides, tree trunks, old brick walls, open grazing lands, uncultivated waste lands, shrub forests, ponds, pools, tanks, swamps or marshes, *etc.* are full of fern diversity.

Polypodiaceae and Pteridaceae are found to be predominant taxa on the basis of their total number of genera and species. The sequence of six families according to their predominance on the basis of their total number of genera and species is given in Table-1.

Table 1. List of Fern families according to their predominance on the basis of total number of genera and species.

Based on the number of genera	Based on the number of species
Polypodiaceae (06)	Pteridaceae (11)
Pteridaceae (05)	Polypodiaceae (10)
Athyriaceae (02)	Thelypteridaceae (04)
Blechnaceae (02)	Athyriaceae (03)
Lycopodiaceae (02)	Salviniaceae (03)
Ophioglossaceae (02)	Selaginellaceae (03)

All the ferns and fern-allies have their food and fodder value, as a resource of drugs and economically significant for the benefit of human beings. The local inhabitants like Bodo, Munda and Garo along with other people of the area are commonly uses the yung fronds of *Diplazium dilatatum*, *D. esculentum*, *Marsilea minuta*, *etc.* as vegetables as well as medicines. Farmers use *Azolla pinnata*, *Salvinia natans* and *S. cuculata* as a green manure in their cultivated fields.

From the distribution point of view *Helminthostachys zeylanica* is known to be rare plant in Assam. Only few populations are known. The present scenario is extremely bad due to habitat loss to the species. Now the species is *ex-situ* conservation in the fern house. So, the immediate suitable conservation strategies need to be progressed before it is lost from the State.

The present study of fern diversity of the region is most essential to record and preserve the species diversity because day by day such valuable natural resources have been declining for ever from our biodiversity. The serious threat is being to such resources by the anthropogenic activities. One of the prime causes is the habitat destruction of fern flora by

unplanned developmental activities. Besides, the larger trees and timbers are being cutting down for construction of bridges, electric posts and as building materials. The hills and wetlands are occupied or destroyed illegally due to over population and migration to the forest areas. The establishment of rock quarries or occupation of waste lands for various purposes like plantation of medicinal plants, tea gardens, construction of power projects, towers, mining, etc.

From this survey author really feels that such natural resources have been neglecting in the society due to the proper knowledge and awareness among the locality. So, the proper conservation strategies need and implement immediately before lost such valuable resources from the region for future generations.

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