

Chapter 3

TAXONOMIC ENUMERATION

3.1 Key to Families

- 1a. Sporangia solitary in axils of simple or once-forked leaves....2
- 2a. Spores of two kinds: large megaspores and much smaller microspores; vegetative shoots often dorsiventral with leaves in 4 ranks, 2 median, with smaller leaves, and 2 lateral, less often uniform and spirally arranged**Selaginellaceae**
- 2b. Spores of one kind, always very small; vegetative shoots usually with leaves uniform and spirally arranged, rarely lateral branches obviously flattened but then leaves not in 2 ranks3
- 3a. stem hollow, sheathed with peltate sporangiophore.....**Equisetaceae**
- 3b. Stem solid, sheath absent without peltate sporangiophore.....**Lycopodiaceae**
- 1b. Sporangia several to very many together borne directly on surface of fronds or frond axes or on specialized sporophores borne on frond or in achlorophyllous strobili, sometimes enclosed within sporocarp or indusium....4
- 4a. Fronds 3-dimensional, divided near base (or middle) into a fertile terminal “panicle” or “spike” and a sterile segment (simple, pinnatifid, or ternate), usually fleshy, vernation usually nodding; caudex subterranean, short, usually erect , apex surrounded by a sheath **Ophioglossaceae**
- 4b. Fronds and caudex not as above, vernation circinate, rarely hooked; apex not sheathed.....5
- 5a. Fronds vine like with a twining rachis**Lygodiaceae**
- 5b. Fronds not vine like, sometimes scrambling but never with a twining rachis...6
- 6a. Fronds membranous, 1 cell thick, or rarely with 2–4 cell layers without intercellular spaces and stomata; sporangia borne on an extended veinlet (receptacle); indusia tubular or 2-lipped, borne on tips or upper margins of segments**Hymenophyllaceae**

- 6b. Fronds herbaceous to leathery, several cells thick with intercellular spaces and stomata; sporangia not borne on extended veinlets.....7
- 7a. Ferns with an erect trunk like rhizome, with large compound fronds in a crown at apex.....8
- 8a. Fertile pinnae without visible lamina; sporangia in dense clusters directly on rachis and rachillae, not covered by indusium or modified lamina**Osmundaceae**
- 8b. Fertile pinnae with distinct lamina; sporangia in orbicular or linear sori or along veins and eventually acrostichoid.....9
- 9a. Stem usually over 8 cm in diam.; sori orbicular or linear along veins and eventually acrostichoid...10
- 10a. Sori discrete, orbicular, medial, with cuplike or scale like indusia or exindusiate **Cyatheaceae**
- 10b. Sori linear along veins and eventually acrostichoid **Marattiaceae**
- 9b. Stem usually less than 8 cm in diam.; sori linear... 11
- 11a. Sori parallel to lateral veinlets or costules, indusia often double **Woodsiaceae**
- 11b. Sori parallel to costa, indusia not double**Blechnaceae**
- 7b. Ferns with rhizome short, creeping or climbing, sometimes massive but then prostrate or hardly longer than wide, never tree like.....12
- 12a. Fronds pseudo dichotomously branched, with a dormant bud in axils of regularly dichotomous forks; ultimate branches pinnate or bipinnatifid **Gleicheniaceae**
- 12b. Fronds simple, pinnatifid, palmate, or pedate, never with buds in axils of branch forks(ignore budlike bulbils along costa or rachis, not associated with branching).....13
- 13a. Fronds simple, uni-pinnate, pinnatifid, rarely pedate.....24
- 13b. Fronds compound14

- 14a. Ferns with long rhizomes and widely spaced fronds**Dryopteridaceae**
14b. Terrestrial ferns with stout erect rhizomes and clustered fronds.....15
- 15a. Stipe with enlarged base; rachis with cushion like or long and Horn like
aerophores at bases of pinnae **Plagiogyriaceae**
- 15b. Stipe without enlarged base; rachis without aerophores.....16
- 16a. Sporangia acrostichoid, uniformly covering abaxial side of lamina
..... **Elaphoglossaceae**
- 16b. Sporangia discrete, in definite sori or ceonosori.....17
- 17a. Fronds with perennating bulbils.....**Aspleniaceae**
17b. Fronds without perennating bulbils.....18
- 18a. Stolon with tubers.....**Nephrolepidaceae**
18b. Stolon without tubers.....19
- 19a.Sori linear to reniform and frond glabrous.....25
19b. Sori globose and fronds hairy.....22
- 20a. Plants grass like.....**Vittariaceae**
20b.Plants not grass like.....21
- 21a. Ulitimate segments rhomboid.....**Davalliaceae**
21b. Ultimate segments oblong to linear.....**Pteridaceae**
- 22a. Plants with costal aeroles..... **Thelypterideaceae**
22b.Plants without costal aeroles.....23
- 23a. Lamina simple.....**Oleandraceae**
23b.Lamina pinnate to pinnatifid.....**Dennstaedtiaceae**
- 24a.Stipe and lamina with red hairs.....**Grammitidaceae**
24b. Stipe and lamina without red hairs.....25
- 25a. Sori exindusiate.....**Polypodiaceae**

25b. Sori double indusiate.....**Lindsaeaceae**

3.1.1 Enumeration of Pteridophytic Flora of Darjiling Hills.

Lycopodiaceae P. Beauvois *ex* Mirbel in Lamarck & Mirbel, Hist.Nat.Veg. 4: 293. 1802. (Plate 3.1)

- 1. Sporangia organized in a strobilus2
- + Sporangia occurring freely i.e. does not produce strobilus
Huperzia
- 2. Sporophytic plants erect *Lycopodiella*
- + Sporophytic plants scrambling *Lycopodium*

Huperzia Bernham, Schrad. J. Bot. 1800(2): 126. 1801.

- 1 Plants usually epiphytic 2
- + Plants usually terrestrial 3
- 2 Leaves linear and scaly.....4
- + Leaves ovate-lanceolate and glossy.....*Huperzia. hamiltonii*
- 3 Leaf margin entire.....5
- + Leaf margin serrate.....*Huperzia. serrata*
- 4 Sporangia arise in the axil of sporophylls*Huperzia. squarrosa*
- + Sporangia arise throughout the length of the stem in the axil of microphylls.....*Huperzia. pulcherrima*
- 5 Leaves reflexed, green, 0.5 - 1.5 × 0.1 - .4 cm.....*Huperzia. heteriana*
- + Leaves ascending, greenish to brownish, 0.4 - 1 × 0.1 - 0. Cm*Huperzia. ceylanica*

LYCOPODIUM Linnaeus, Sp. Pl. 2: 1100. 1753.

Lycopodium japonicum Thunberg. Fl. Jap. 341. 1784; Dixit, Cens. Indian Pterid. 9. 1984; Thapa, Pterid. Nepal 24. 2002; Ghosh, Pterid. Fl. East. Ind. I: 86. 2004; Fraser-Jenkins, Tax. Revi. Three Hundr. Ind. Subcon. Pter. With Rev. Cen. List 519. 2008.

Lycopodium pseudoclavatum Ching, Acta Bot. Yunnan. 4(3): 222. 1982.

Herbaceous with creeping Runner, forked, green; lateral branches erect, up to 30 cm tall, 0.5 – 1 cm in diameter, multiple times dichotomously branched; Leaves microphyllous, spirally arranged, dense, angled upward, linear-lanceolate, 0.4 – 0.6 × 0.2 – 0.4 cm, herbaceous, midrib indistinct, base cuneate, sessile, margin entire, apex acuminate; Strobili 3 – 4 on a peduncle, pedicels erect with varying length, 2 – 5 × 0.2 – 0.4 cm, Strobili cylindrical, 3 – 8 × 0.4 – 0.7 cm; Sporophyll broadly ovate, 2 – 3 × ca. 3 mm, papery, apex acute, with long aristate tip; Sporangia slightly exposed, Spores 30 – 35 µm, tetrahedral, creamish in colour.

Exsiccatae: West Bengal, Darjiling hills, Third mile, 12.08.2011, *Nayan Thapa & Dorjay Lama*, 026A (SJCBH), 026B (LBH), 27° 00'31.7" N and 88°17' 37.4" E, alt. 2154 ± 15 m.

Local Distribution: Third mile, Sukhia, Tonglu, Lava, Chimney.

Global Distribution: Bhutan, Cambodia, China, India, Japan, Laos, Myanmar, Nepal, Vietnam.

LYCOPODIELLA Holub, Preslia 36: 22. 1964.

Lycopodiella cernua (Linnaeus) Pich. Sermolli, Webbia **23**: 166 .1968; Thapa, Pterid. Nepal 24. 2002; Fraser-Jenkins, Tax. Revi. Three Hundr. Ind. Subcon. Pterid. With Rev. Cen. List 519. 2008.

Lycopodium cernuum Linnaeus, Sp. Pl. **2**: 1103. 1753.

Lycopodium clavatum sensu Clarke, Trans. Linn. Soc. Ser. II. Bot. 1: 592. 1880.

Lycopodium cernuum Linnaeus var. *sikkimense* (O.F. Mull) H.S. Kung, Acta Phytotax. Sin. **18** (2): 239. 1980.

Herbaceous with creeping runner, forked, creamish; Stem erect, 30-60 c.m in height, Ca. 0.5 -1c.m in diameter, dichotomously branched; Leaf microphyllous, spirally arranged, monomorphic, lanceolate, midrib indistinct, margin entire, base cuneate, decurrent, sessile, apex acuminate, 0.2-0.4 × 0.8-1cm; Strobili solitary, 1-1.4 × 0.4-0.6 cm, drooping, stalked, pedicels 0.2-1 × 0.1-1.2 cm; Sporophylls different from trophophylls, subulate to lanceolate, imbricate, margin membranous and irregularly toothed, apex acute; Sporangia yellow, reniform; Spores 25-32 µm, tetrahedral, yellowish in colour.

Exsiccatae: West Bengal, Darjiling hills, Lebong, 15.08.2011, *Nayan Thapa & Dorjay Lama*, 048A (SJCBH), 048B(LBH), 27°04'13.5'' N and 088°16'59.7'' E, alt .1550 ± 11.5 m

Local Distribution: Rungdung, Dhotrey, lebong, Jamuna.

Global Distribution: Bhutan, China, India, Nepal.

HUPERZIA Bernhardi in *Shrad. J. Bot.* 1800(2): 126. 1801.

(Thunberg) Trevisan, *Atti. Soc. Ital. Sci. Nat.* **17**: 248. 1875; Dixit, *Cens. Indian Pterid.* 7. 1984; Thapa, *Pterid. Nepal* 23. 2002; Ghosh, *Pterid. Fl. East. Ind. I*: 51. 2004; Fraser-Jenkins, *Tax. Revi. Three Hundr. Ind. Subcon. Pter. With Rev. Cen. List* 519. 2008.

Lycopodium serratum Thunberg in Murray, *Fl. Jap.* 341, t.38. 1784.

Urostachys serratus (Thunberg) Herter, *Bot. Arch.* **3**: 13. 1923.

Herbaceous, rooted at base, isodichotomous branching, terrestrial; stem erect, 5 – 25 cm, 0.1 – 0.4 cm in diameter, 2 – 3 times dichotomously branched, bulbils at the tip; leaves sparse, right angles to the stem, lustrous, elliptic, contracted toward base, straight, 1 – 2.5 × 0.4 – 0.6 cm, thinly leathery, both surfaces glabrous, midrib conspicuously raised, base cuneate, decurrent, petiolate, margin irregularly toothed, apex acuminate; Sporophylls homomorphic with trophophylls; sporangia visible on both sides of sporophylls, yellowish, reniform to kidney shaped; ca. 0.4 – 0.8 × 0.2 – 0.4 cm. Spores 22 – 32 µm, tetrahedral, yellowish.

Exsiccatae: West Bengal, Darjiling hills, Lebong, 15.08.2011, *Nayan Thapa & Dorjay Lama*, 049A (SJCBH), 049B (LBH), 27°04'13.5'' N and 088°16'59.7'' E, alt .1550 ± 11.5 m

Global Distribution: Australia, Bhutan, Cambodia, China, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Philippines, Russia, Sri Lanka, Thailand, Vietnam.

Local Distribution: Lebong, Jalapahar, Lava, Takdah, Third mile.

Huperzia herteriana (Kümmerle) T. Sen & U. Sen, Fern Gaz. **11** (6): 415, f.1a-j. 1978; Dixit, Cens. Indian Pterid. 7.1984; Thapa, Pterid. Nepal 22. 2002; Ghosh, Pterid. Fl. East. Ind. I: 58 – 59.2004; Fraser-Jenkins, Tax. Revi. Three Hundr. Ind. Subcon. Pter. With Rev. Cen. List 518. 2008.

Lycopodium herterianum Kümmerle, Magyar Bot. Lap. **26**: 99. 1928.

Lycopodium sikkimense Herter, Bot. Jahrb.**43**: 42. 1909.

Urostachys sikkimensis (Herter) Herter ex Nessel, Lycopod.: 52, t.7, f.1. 1939.

Urostachys herterianus (Kümmerle) Herter, Ind, Lycopod.: 64. 1949.

Herbaceous, terrestrial, rooting at base, isodichotomous branching; erect, ascending, 4-12 × 0.2- 0.4 cm in diameter, 2-4 times dichotomously branched, ultimate end with bulbils; Leaves dense, reflexed, lustrous, oblanceolate, falcate, 0.6-1.2 × 0.1-0.3 cm, leathery, midrib indistinct, base cuneate, decurrent, sessile, margin straight, upper portion with small teeth, apex acute; Sporophylls homomorphic with trophophylls; sporangia visible on both sides of sporophylls, Ca. 0.3-0.6 × 0.1-0.3 cm, reniform yellowish; Spores 25-30 µm, tetrahedral, pitted, creamish-yellow in colour.

Exsiccatae : West Bengal, Darjiling hills, Chitrey, 10.08.2011, *Nayan Thapa & Dorjay Lama*, 055A (SJCBH), 055B(LBH), 26°59'23'' N and 088°06'57.2'' E, alt. 2232±15 m

Global distribution: Bhutan, China, India, Nepal.

Local Distribution: Chitrey, Tonglu, Senchel, Rachela, Jalapahar.

Huperzia ceylanica (Spring) Trevisan, Atti. Soc. Ital. Sci. Nat. 17: 248. 1875; Dixit., Lycopod. India 44. 1987; Fraser-Jenkins., Tax. Revi. Three Hundr. Ind. Subcon. Pter. With Rev. Cen. List 518. 2008.

Lycopodium ceylanicum Spring, Mem. Acad. Sci. Belg. 15(1): 37. 1843; 24(2): 16. 1850; Bak. Handb. Fern allies 11.1887.

Huperzia ceylanica (Spring) Rothmaler, Feddes Repert. 54(1): 59. 1944 (Superfl).

Herbaceous, rooting at base, growing on exposed rocky surfaces; terrestrial, erect, 7-16 × 0.3- 0.6 cm, 1-4 times dichotomous branching, Leaves 8 whorled, green to pale green, ascending in the upper half, reflexed at the basal part, thin, lingulate, Ca. 0.8-1 × 0.2-0.4 cm, sparsely serrate at apex, midrib distinct; Sporophyll homomorphic with trophophylls, sporangia borne on the axil of leaves at the upper

half, short apical part with only vegetative leaves; Sporangium Ca. $0.4-0.6 \times 0.2-0.3$ c.m, reniform, yellowish in colour ; Spores $35-40 \mu\text{m}$, tetrahedral, pitted, pale in colour.

Exsiccatae: West Bengal, Darjiling hills, Chitrey, 10.08.2011, *Nayan Thapa & Dorjay Lama*, 160A (SJCBH), 160B(LBH), $26^{\circ}59'23''$ N and $88^{\circ}06'57.2''$ E, alt. 2232 ± 15 m.

Global Distribution: India, Java, Srilanka.

Local Distribution: Chitrey, Jalapahar, Tonglu.

Huperzia squarrosa (Froster) Trevisan, Atti Soc. Ital. Sci. Nat. **17**: 247 (1875); Dixit, A cens. of Indian Pterid. 8.1984 ; Dixit, Lycopod. of India 65.1987; Thapa, Pterid. of Nepal 23.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 519.2008.

Lycopodium squarrosum Froster, Fl. Ins. Austr. Prodr.: 86 (1786).

Lycopodium verticillatum Willdenow, Sp. Pl. **5**: 48 (1810).

Lycopodium hookeri Wallich ex Hooker & Greville, Ic. Fil. **2**: t. 185 (1829).

Phlegmariurus squarrosus (Froster) A. Löve & D. Löve, Taxon **26** (2-3): 324 (1977).

Urostachys squarrosus (Froster) Herter, Bot. Arch. **3**: 14 (1923), Ind. Lycopod.: 83 (1949).

Plant epiphytic, Stems caespitose, branches pendulous, 1 – 8 times forked, $25-75 \times 0.2-0.5$ cm; Trophophylls lustrous, lanceolate, attached at right angles, $0.5-2 \times 0.2-0.4$ cm, leathery, midrib distinct, base cuneate, decurrent, margin entire, apex acute; Strobili terminal on branches Sporophylls densely arranged, ovate-lanceolate, $0.6-1.2 \times ca. 0.2$ cm, margin entire, apex acute; Sporangia yellowish, reniform, vertically bisected; Spores $28-35 \mu\text{m}$, tetrahedral, greenish-white in colour.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10.09.2012, *Nayan Thapa & Dorjay Lama*, 075A (SJCBH), 075B(LBH), $27^{\circ}02'12''$ N and $88^{\circ}20'1.3''$ E, alt. 1050 ± 15 m

Global Distribution: Bhutan, Cambodia, China, India, Laos, Madagascar, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand.

Local Distribution: Mangwa, Teesta valley, Makaibari, Pandam.

Huperzia hamiltonii(Sprengel) Trevisn, Atti Soc. Ital. Sci. Nat., 248,1875; Dixit, A cens. of Ind. Pterid.7.1984 ; Dixit, Lycopod.of India, 48,1987; Thapa, Pterid. of Nepal 22.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a revi. Cen. List 518.2008.

Lycopodium hamiltonii Sprengel in Linnaeus, Syst. Veg. **5**: 492 (1828);

Lycopodium obtusifolium Hameed *ex* D.Don, Prodr. Fl. Nepal.: 18 (1825), *non* Sw. (1806).

Lycopodium aloifolium Wallich *ex* Hooker & Greville, Ic. Fil.: t.233 (1831).

Lycopodium empetrifolium Dalzell, Hooker J. Bot. (1852).

Phlegmariurus hamiltonii (Sprengel) A.Löve & D.Löve, Taxon **26** (2-3): 324 (1977).

Urostachys hamitonii (Spring) Herter *ex* Nessel, Lycopod.: 68 (1939), Ind. Lycopod.: 63 (1949).

Plants epiphytic, pendulous, 8 -10 × 0. 2-0.4 cm, forked dichotomously; Trophophylls slightly angled upward, slightly oblong, 1-1.5 × 0.3-0.5 c.m, base cuneate, decurrent, lustrous, leathery, midrib distinct, margin entire, apex obtuse; Sporophyll like vegetative leaves, sporangia on the axil of sporophyll in the upper half, Sporangia Ca. 0.6-1 × 0.2-0.4 cm, reniform, vertically bisected yellowish;Spores 28-32 µm,tetrahedral, pitted, pale in colour.

Exsiccatae : West Bengal,Darjiling hills, Singamari,02.07.2011, *Nayan Thapa & Dorjay Lama, 010A (SJCBH), 010B(LBH), 267°03'15.1'' N and 088°14'23.1''E, alt.1950±12m*

Global Distribution: Bhutan, China, India, N Myanmar, Nepal.

Local Distribution: Singamari, Senchel, Lava, Chimney.

Huperzia pulcherrima (Wallich *ex* Hooker & Greville) Pich. Sermolli, Webbia 25 (1): 219-297 (1970); Dixit, A census of Indian Pteridop. 8.1984 ; Dixit, Lycopod. of India 60.1987; Thapa,Pterid. of Nepal 23.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a revi. Cen. List 519.2008.

Lycopodium pulcherrimum Wallich ex Hooker. & Greville, Ic. Fil.: t.38 (1827)
Lycopodium setaceum Hameed ex D.Don, Prodr. Fl. Nepal.: 18 (1825)
Lycopodium setaceum Hameed ex D.Don var. *pulcherrimum* (Wallich ex Hooker & Greville) C.B.Clarke, Trans. Linn. Spc. Lond. II Bot.1: 590 (1880).
Lycopodium taiwanense C.M.Kuo, Taiwania **30**: 51 (1985); Tsai & Shieh, Fl. Taiwan ed.2 **1**:43 (1994).
Phlegmariurus pulcherrimus (Wallich ex Hooker & Greville) A.Löve & D. Löve, Taxon **26** (2-3):324 (1977).
Urostachys pulcherrimus (Wallich ex Hooker & Greville) Herter, Ind. Lycopod.: 77 (1949).

Plants epiphytic, 10-50 × 0.8- 1.4 c.m, pendulous, 2-4 times forked; Leaves linear, 0.8-1.2 × 0.2-0.5 cm, erecto patent, margins wavy, involute, slightly decurrent at base, midrib indistinct, yellowish-green in colour; Sporophyll like vegetative leaf, fertile from the middle to the apex, Sporangia in the axil of sporophyll, Ca.0.3 × 0.6-0.1-0.3 cm, kidney shaped, yellowish in colour; Spores 28-30µm, tetrahedral, pitted, yellowish in colour.

Exciccatae : West Bengal, Darjiling hills, Rungdung, 05.07.2011, *Nayan Thapa & Dorjay Lama*, 012A (SJCBH), 012B(LBH), 27°01'16'' N and 088°16'24.5'' E, Alt.1455±13.1m

Global Distribution: Sri lanka, Bhutan, Nepal, India.

Local Distribution: Rungdung, Mungpoo, Mangwa, Balason, Barnesbeg.

Selaginellaceae Willkorm in Anleit. Stud. Bot.2:163.1854.

Selaginella P. Beauvois, Prodr. Aethéogam. 101. 1805.

1. Strobilus 0.5-1.2 × 0.2-0.4 cm.....2
- + Strobilus 0.3-0.5 × 0.1-0.2 cm..... *Selaginella chrysocaulos*
2. Branches 2-3 pairs..... *Selaginella subdiaphana*
- + Branches 4-6 pairs.....3
3. Sporophyll isomorphic.....4
- + Sporopyll dimorphic.....6
4. Lateral leaf 0.4 × 0.3 cm..... *Selaginella vaginata*
- + Lateral leaf 0.3 × 0.1cm.....5

- 5. Microspore spherical, 35×50µm.....*Selaginella repanda*
- + Microspore 30× 20µm.....*Selaginella pulvinata*
- 6. Megaspore globose, 350-370µm.....*Selaginella bisulcata*
- + Megaspore ovoid, 290× 310µm.....*Selaginella monospora*

Selaginella bisulcata Spring, Mem. Acad. Sci. Beig. 24(2):259.1850; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 100.1965; Dixit, A cen. of Indian Pterid. 11.1984; Thapa, Pterid. of Nepal 25.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 520.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:60.2015.

Plant herbaceous, lithophytic, creeping; rhizophore arising from upper $\frac{3}{4}$ th of stem; plants 20-60 cm, light green; stem stramineous to castaneous, glabrous; branches alternate, 6 pairs, distant, 4-6 cm; leaf dimorphic, lateral leaf oblong, dentate, acute, 0.5× 0.2 cm, median leaf lanceolate, dentate, aristate, 0.3×0.1 cm; strobilus quadrangular, 0.5-1× 0.2-0.4 cm; sporophyll dimorphic, larger sporophyll oblong, dentate, acute, 0.4× 0.2, smaller sporophyll lanceolate, dentate, acute, 0.2× 0.1 cm; megaspore globose, smooth, brown, 350-370µm; microspore tetrahedral, warty, grayish-brown, 20×28µm.

Exsiccatae: West Bengal, Darjilinghills, Lebong, 27/05/13, Nayan Thapa, 039A (SJCBH), 039B (LBH), N27°04' 15.05'' and E088°216' 56.7'', Alt: 1859m±11.

Global Distribution: Bhutan, china, India, Nepal.

Local distribution: Lebong, Meghaa, Allubari,

Selaginella chrysocaulos (Hooker & Greville) Spring, Bull. Acad. Roy. Sci. Bruxelles. 10: 232. 1843; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 100.1965; Dixit, A cen. of Indian Pterid. 12.1984; Thapa, Pterid. of Nepal 25.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List. 521.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:62.2015.

Lycopodium chrysocaulos Hooker et Greville in Hooker Bot. Misc. 2: 401. 1831.

Selaginella hypnoides Sprong, Mem. Acad. Sci. Belg. 24(2):101.1850.

Plants herbaceous, lithophytic, terrestrial; rhizophore arising at base, pale, 4-6 cm; root with tubers; plants 10-20 cm, yellowish-green; stem stramineous, 4-5 cm; branches 5-8 pairs, alternate; leaf dimorphic, ascending, ventral leaf ovate, oblique, margin dentate, apex acute, 0.5 × 0.3 cm, dorsal leaf ovate-lanceolate, margin dentate, apex aristate, 0.5 × 0.1 cm; srobili quadrangular, short, 0.3-0.5 × 0.1 cm; sporophyll dimorphic, megasporophyll oblong, base oblique, margin dentate, obtuse, 0.4 × 0.2 cm, microsporophyll ovate-lanceolate, margin dentate, acuminate, 0.4 × 0.1 cm; megaspore dark-brown, perisporate, 300-310 μm; microspore tetrahedral, spinose to tuberculate, orange, 45-50 μm.

Exsiccatae: West Bengal, Darjilinghills, Third mile, 04/05/11, Nayan Thapa, 02A (SJCBH), 02B (LBH), N27°00'31.5'' and E088°17'37.7'', Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Nepal, Pakistan, Vietnam.

Local distribution: Third mile, Chatakpur.

Selaginella monospora Spring, Mém. Acad. Roy. Sci. Belgique. 24: 135. 1850; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 101.1965; Dixit, A cen. of Indian Pterid. 14.1984; Thapa, Pterid. Of Nepal 27.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 62.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 522.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 73.2015.

Selaginella gorvalensis Spring, Mem. Acad. Sci. Belg. 24(2):286.1850.

Selaginella pulmosa var *monospora* (Spring) Baker, Journ. Bot. 21:145.1883.

Plants herbaceous, lithophytic, creeping; rhizophore arising from lower 1/2 of stem, pale, 6-7 cm; plants 10-80 cm, stem pale to stramineous; branches pinnately compound; leaf dimorphic, pinkish-green, ascending, ventral leaf ovate, base

oblique, margin dentate, apex acute, 0.4 × 0.2 cm, median leaf ovate, margin denticulate, apex aristate, 0.4 × 0.1 cm; strobilus quadrangular, short, 0.5-1 × 0.1-0.2 cm; sporophyll dimorphic, megasporophyll oblong, margin dentate, acute, 0.3 × 0.2 cm, microsporophyll ovate-lanceolate, dentate, acute, 0.2 × 0.1 cm; megaspore ovoid, dark-brown, tuberculate, 290 × 310 μm; microspore spherical, minutely tuberculate, orange, 29 × 37 μm.

Exsiccatae: West Bengal, Darjilinghills, Thirdu mile, 01/10/11, *Nayan Thapa*, 074A (SJCBH), 074B (LBH), N27°00'31.5'' and E088°17'37.7'', Alt: 2154m ± 15.

Global distribution: Bhutan, India, Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Thirdu mile, Lebong, Senchel.

Selaginella pulvinata (Hooker et Greville) Maxim., Acad. Imp. Sci. Petersb. 9:335. 1857; Dixit, A cen. of Indian Pterid. 16.1984; Thapa, Pterid. Of Nepal 28.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 523.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 78.2015.

Lycopodium pulvinatum Hooker & Greville in Hooker Bot. Misc. 2:381.1831.

Plants coriaceous, lithophytic, terrestrial, erect; rhizophore absent, rooting at base; plants 15-30 cm, dark green; stem purplish to stramineous, hard, rough; branches 4-6 pairs, alternate; leaf dimorphic, ascending, ventral leaf ovate-oblong, base rounded, margin dentate, acute, 0.3 × 0.1 cm, dorsal leaf ovate, margin dentate, apex aristate, 0.2 × 0.1 cm; strobilus quadrangular, short, 0.5-0.9 × 0.1 cm; sporophyll isomorphic, ovate, margin dentate, apex acuminate, 0.2 × 0.1 cm; megaspore orange, tuberculate, orbicular, 250-270 μm; microspore tetrahedral, minutely spinose, orange, 20 × 30 μm

Exsiccatae: West Bengal, Darjilinghills, Lebong, 18/07/11, *Nayan Thapa*, 121A (SJCBH), 121B (LBH), N27°04'12.05'' and E088°216'49.7'', Alt: 1456m ± 9.

Global distribution: Bangladesh, Bhutan, China, India, Nepal, Vietnam.

Local distribution: Rungdung, Rambhi.

Selaginella repanda (Desvaux ex Poiret) Spring in Gaudichaud, Voy. Bonite, Bot. 1: 329. 1844; Dixit , A cen. of Indian Pterid.16.1984; Thapa, Pterid. Of Nepal 29.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 523.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:80.2015. (Plate:3.3)

Lycopodium repandum Desvaux ex Poiret in Lamarck, Encycl., Suppl. 3: 558.

Plants herbaceous, lithophytic, sub-erect; rhizophore arising from base of the stem; plants, 10-30 cm, pale ; branches arising from base, 4-6 pairs ,alternate;leaf dimorphic, ventral leaf ascending, ovate, base auriculate, ciliated throughout , acroscopic half,0.2× 0.1 cm, dorsal leaf ovate, dentate-ciliate, acuminate, 0.15× 0.1 cm; strobilus rounded,0.5-0.7× 0.1-0.3 cm; sporophyll isomorphic, ovate, ciliate, acuminate, 0.1×0.1 cm; megaspore ovoid to globose, brown,260-290µm; microspore spherical to tetrahedral, spinouse, red,35×50µm.

Exsiccatae : West Bengal,Darjiling hills,Kuresong,13/12/11, *Nayan Thapa & DorjayLama,099A(SJCBH), 099B (LBH),N26°53'03.4''and E088°17'1.1''*,Alt: 1498m±10.1.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Dowhill, Kuresong.

Selaginella subdiaphana (Wallich ex Hooker & Greville) Spring,Bull.Acad.Roy. Sci.Brux. 10:232.1843; Mehra &Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 101.1965; Dixit , A cen. of Indian Pterid.17.1984; Thapa, Pterid. Of Nepal 29.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 523.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:80.2015.

(Plate:3.2)

Lycopodium subdiaphanum wallich ex Hooker & Greville,Hook .Bot.Misc. 2:401. 1831.

Plants herbaceous, lithophytic, light-green, terrestrial, erect; rhizophore arising from lower ¼, pale, 2-4 cm; plants 10-25 cm, light green; branches alternate, 2-3 pairs; leaf dimorphic , ventral leaf ascending, ovate-lanceolate,acroscopic base

auriculate , ciliated at base, dentate at upper half, apex acute, 0.2× 0.1 cm, dorsal leaf ovate, base rounded, serrulate, acuminate, 0.1× 0.1 cm; strobilus quadrangular, 0.5-1.2× 0.1-0.2 cm; sporophyll dimorphic, megasporophyll ovate, acute, 0.1×0.1 cm, microsporophyll ovate, aristate, ciliate. 0.1× 0.05 cm; megaspore brown , warty, spherical, 250-270µm; microspore orange-red, tetrahedral to spherical, 33-37µm.

Exsiccatae : West Bengal, Darjiling hills, Makaibari, 13/12/11, *Nayan Thapa & Dorjay Lama*, 100A(SJCBH), 100B (LBH), N26°33'03.4'' and E088°16'1.1'', Alt: 1151m±11.1.

Global distribution: Bhutan, China, Nepal, India.

Local distribution: Rohini.

Selaginella vaginata Spring, Mem. Acad. Belg. 24(2):87.1850; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 100.1965; Dixit, A cen. of Indian Pterid. 17.1984; Thapa, Pterid. Of Nepal 30.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 523.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:85.2015.

Selaginella imbricate Scott. Journ. Agr. Hort. Soc. India 1:270.1868.

Plants herbaceous, lithophytic, creeping, prostrate; rhizophore arising throughout the stem; stem 5-20 cm, slender, stramineous; branches alternate, branching from the base, 3-5 pairs; leaf dimorphic, lateral leaf perpendicular to the stem, straight, ovate-oblong, ciliate at base, dentate at margin, apex sub acute, 0.4× 0.3 cm, dorsal leaf ovate, dentate, acuminate, 0.3× 0.2 cm; strobilus quadrangular, 0.3-0.6× 0.1-0.3 cm; sporophyll isomorphic, oblong-lanceolate, dentate, sub acute, 0.2× 0.1 cm; megaspore circular to ovoid, dark brown , smooth, 230-260µm; microspore spherical , scarlet, 30-45µm.

Exsiccatae : West Bengal, Darjiling hills, Makaibari, 13/12/11, *Nayan Thapa & Dorjay Lama*, 101A(SJCBH), 101B(LBH), N26°33'02.4'' and E088°16'10.1'', Alt: 1131m±11.1.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Makaibari, Tukvar.

Equisetaceae Richard ex A.p. Candolle in Lamarck et A.P. de Candolle, Fl.Franc.ed 3,2:580.1805.

Linnaeus, Sp. Pl.:1061.1753.

1 Plant less than 3 feet in height, Strobilus stalked...*Equisetum arvense* subsp.*diffusum*

+ Plant more than 3 feet in height, strobilus sessile...*Equisetum ramosissimum*

Equisetum arvense Linnaeus subsp.**diffusum** Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:87.2015.

Equisetum arvense ,Don, Prodr. Fl. Nepal.: 19 .1825.

(Plate:3.4.A,B,C)

Plants lithophytic, terrestrial, erect, herbaceous with perennial underground rhizome; rhizome erect, shining, brown; aerial stems annual, monomorphic, 10-70 cm tall, 0.1-0.4 cm in diam., branched; internodes 1.5-6 cm; Main stem axis with 4-10-ridged; each side of ridge raised and forming edges reaching lower sheath teeth; sheath teeth long, narrow, grayish green in lower portion, blackish brown .in upper portion, with a deep groove going through back of sheath; sheath teeth 5-10, blackish brown, 0.4-0.7 × 0.1-0.4 cm, lanceolate, leathery, caudate at apex, persistent; Lateral branches slender, rigid, 4-8-ridged; sheath teeth 4-6, greyish green, deltoid, leathery, persistent; Strobilus terete, 1-7 × .4-.6 cm, apex blunt; stalk prolonged when mature , 1-1.3 cm. Sporangioophores Ca.0.5-0.6 cm apart, whorled, 7-8, peltate, stalk, 1-.2 cm long; Sporangia 7-9 whorled, dehiscing longitudinally, light brown, ovoid, 300 × 250 μm; Spores spherical, chlorophyllous, 34 -42 μm , with hygroscopic elaters.

Global Distribution: Bhutan, India, Japan, Kashmir, Myanmar, Nepal, Pakistan, Vietnam, China.

Local Distribution: Third mile, Lebong, Singamari, Lava, Algaraha, Deer park.

Exsciccatae : West Bengal, Darjiling hills, Lebong, 15/08/2011, Nayan Thapa & Dorjay Lama, 045A(SJCBH), 045B(LBH), N27°04'13.5'' and E088°16'59.7'', Alt : 1550m ± 11.5

Equisetum ramosissimum Desf., Fl. Atlant. **2**: 398 1800; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 99, 1965; Dixit, A Cen. of Indian Pterid. 198. 1984; Thapa, Pterid. Of Nepal 31. 2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 38-39. 2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 80, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 523. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 89. 2015.

(Plate: 3.4.D,E,F)

Equisetum ramosissimum Desf. subsp. *debile* (Roxb. ex Vaucher) Hauke, Amer. Fern J. **52**: 33 (1962); Dixit: 20 (1984).

Equisetum debile Roxb. ex Vaucher, Mém. Soc. Phys. Hist. Nat. Genève **1**: 387 (1822).

Equisetum ramosissimum Desf. Subsp. *incanum* (Vaucher) Pignatti, Glorn. Bot. Ital. **116** (1-2): 93 (1982 publ. 1983).

Equisetum x wallichianum C.N. Page, Fern Gaz. **11** (1): 25-47 (1974 publ. 1972)

Hippochaete debilis (Roxb. ex Vaucher) Holub, Preslia **44** (2): 122-130 (1972)

Hippochaete ramosissima (Desf.) Börner subsp. *debilis* (Roxb. ex Vaucher) A. Löve & D. Löve, Taxon **26**: 325 (1977)

Plants perennial creeping to erect, medium sized herbs; Rhizome erect, ascending, blackish brown; aerial stem perennial, monomorphic, green, 20-180 × 0.3-0.9 cm tall, lower portion of main stem often branched, tufted; internodes 2-10.5 cm; young whorled branches conspicuous; main stem 5-10-ridged, ridges arc-shaped

abaxially, sheath tubes narrow, up to 1 cm, lower portion grayish green, upper portion usually grayish brown; sheath teeth 5-20, greyish white, membranous, persistent. Lateral branches hard, terete, 5-12-ridged; ridge; sheath teeth 5-10, upper portion brown, lanceolate, leathery but membranous at margin, usually persistent; Strobilus sessile, terminal on branch, 0.5-2.5 cm × 0.4-0.7 cm, oblong, apiculate. Spores spherical, chlorophyllous, 90-120µm, with strap to form elaters.

Global Distribution: Nepal, Myanmar, Thailand, China, Taiwan, India.

Local Distribution: Rungdung, Balason, Mangwa, Kalijhora.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 05/07/2011, Nayan Thapa & Dorjay Lama, 011A (SJCBH), 011B(LBH), N27°01'16'' and E088°16'24.5'', Alt: 1455±13.1m

Ophioglossaceae (Br.) Agardh, Aphor.Bot.8:113,1822.

- | | |
|--|---|
| 1. | Lamina |
| simple, 1.5-7 × 1.2-3 cm..... | Ophioglossum |
| + Lamina pinnate, 4-30 × 2-24 cm..... | Botrychium |
| Botrychium Swartz, J. Bot. (Schrader). 1800(2): 8, 110. 1801. | |
| 1. Plant less than 10 cm in height..... | <i>Botrychium dussenii</i> |
| + Plant more than 10 cm in height..... | 2 |
| 2. Common stalk 1- 4 cm in length..... | 3 |
| + Common Stalk more than 5 cm in length..... | 4 |
| 3. Ultimate pinnule acute..... | <i>Botrychium ternatum</i> |
| + Ultimate pinnule rounded..... | <i>Botrychium multifidum</i>
<i>subsp.robustum</i> |
| 4. Fertile spike arising above the second pinnae..... | <i>Botrychium langunisoum</i> . |

+ Fertile spike arising below the sterile lamina..... *Botrychium daucifolium*.

Botrychium daucifolium Wallich *ex* Hooker & Grev, Ic, Fil.: t.161 1829; Beddome, Handb. Ferns Brit. India (with Supl), 469, 1892; Dixit, A Cen. of Indian Pterid 21 .1984; Thapa, Pterid. Of Nepal 32. 2002;Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 526.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:92.2015.

Sceptridium daucifolium (Wallich *ex* Hooker & Greville) Lylon, Bot. Gaz. **40**: 457 (1905); Ghosh,The Pterid. Flo. Of East.Ind,I, 38-39,2004.

Botrychium subcarnosum Wallich *ex* Hooker & Grev, Hooker Bot. Misc. **3**: 222 (1883).

Botrychium subcarnosum Wall, List no. 49 (1829), *nom. nud.*

Plant lithophytic, terrestrial, erect; rhizomes erect, cylindrical, bearing fleshy roots; Frond 27–50 cm; stipe, 12–20 × 0.3–0.5 cm, greenish, fleshy, hairy; Sterile lamina glabrous, tripinnatifid, subpentagonal, 15–30 × 16–24 cm, herbaceous; pinnae 6–7 pairs, alternate, shortly stalked; basal pinnae largest, triangular, 7–12 × 4–8 cm; Pinnules 4 or 5 pairs, narrowly ovate to broadly lanceolate, lower basal pinnule largest, up to 2–3 × 1–1.5 cm, ultimate segments sharply serrate, apex acute, rachis and costae with sparse, white, long hairs; Sporophore arising from the middle of common stipe, as long as sterile lamina, with stalk 14–16 cm, bi-tripinnate, with long soft hairs; Sporangia globose, shortly stalked, 0.5–1 cm in diam.; Spore yellowish, Spherical, smooth, 30–35 μm.

Exsiccatae : West Bengal, Darjiling hills, Mirik, 12/07/1, *Nayan Thapa & Dorjay Lama*, 023A (SJCBH), 023 B(LBH), N26°54'1.23" and E088°10' 2.31" Alt : 1436m ± 15

Global Distribution: Bhutan, India, Indonesia (Sumatra), Myanmar, Nepal,

Philippines, Sri Lanka, Vietnam.

Local Distribution: Mirik, Mungpoo, Mangwa, Relli.

Botrychium lunaria (Linnaeus) Swartz, Schrad. J. Bot. 1800 (2): 110 .1801;
Bedd., Handb. Ferns Brit. India (with Supl), 469, f. 293, 1883.

Osmunda lunaria L, Sp. Pl. **2**: 1004 (1753).

Botrychium dusenii Alston, Lilloa 30:107.1960.

Plant small, terrestrial, erect; rhizomes short, erect; 5–15 cm tall; Common stipe greenish, cylindrical, 4–12 × 0.2–0.3 cm, hollow; Sterile lamina pinnate, sessile, oblong, 3–8 × 1.5–2.5 cm, fleshy, leathery, glabrous, apex rounded or blunt; pinnae 4–6 pairs, approximate, opposite, flabellate (fan-shaped), lunate, 1–1.5 × 0.2–0.4 cm, shortly stalked to almost sessile, margin entire, veins free, flabellately forked, glabrous; Sporophore with stalk 4–7 cm, glabrous, panicle 2- 3-pinnate, 3–6 × 1.5–2 cm; sporangia sessile, large, 0.5–1 cm in diam.; Spores spherical, yellowish, surface verrucose, 20–25 μm.

Exciccatae : West Bengal, Darjiling hills, Sandhakphu, 24/06/2013, *Nayan Thapa & Dorjay Lama*, 142A(SJCBH), 014252(LBH), N27°07'41.4' and E087°59'29.5', Alt : 3521 m ± 11.

Global Distribution: Asia, Australia, Europe, North America, Pacific islands.

Local distribution: Sandhakphu, Phalut

Botrychium multifidum (Gmel) Rupr subsp. **robustum** Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:159.2015.

Osmunda multifidia Gmel, Nov. Comm. Acad. Sci. Pterid. **12**:517, t.11 .1768.

Sceptridium multifidum (Gmel) Nishida ex Tagawa, J. Jap. Bot. **33**: 200 .1958.

Sceptridium robustum (Rupr.) Lyon, Bot. Gaz. **40**: 458 .1905;

Plants lithophytic, terrestrial; rhizomes erect, cylindrical; Fronds 35–40 cm tall; Sterile lamina stalk 2–7 × 0.5–1 cm, fleshy; lamina bi- or tripinnatifid, dull green, pentagonal, 6–11 × 7–11 cm; pinnae 4–6 pairs, sub-opposite, lower ones stalked; basal pinnae largest, ovate to triangular, 4–6 × 2.5–4.5 cm, bipinnate to tripinnatifid;

pinnules 3 - 4 pairs, narrowly oblong - lanceolate, lower basal pinnule longest, 2.5–4 × 1.5–2 cm; ultimate segments oblong, margin dentate; costae and costules beneath sparsely lanuginose, lateral veins obscure; Sporophore arising from middle or lower part of common stipe, with longer stalk, 10–25 cm, bi-tripinnate, sporangia ellipsoid-globose, in ultimate branches of panicle; Spore creamish, spherical - ellipsoidal, 28–33 μm.

Exsiccatae : West Bengal, Darjiling hills, Gayribas, Date 13/07/13, *Nayan Thapa & Dorjay Lama, 174 A (SJCBH), 174 B (LBH)*, N27°03'31.7'' and E088°01'25'', Alt: 2501 m ± 15

Global Distribution: Japan, Korea, Russia, India, Nepal, Bhutan.

Local Distribution: Gayribas, Alubari, Phalut.

Botrychium ternatum (Thunberg) Swartz, *Scrad. J. Bot.* **1800** (2), 111. 1801; Beddome, *Handb. Ferns Brit. India* (with Supl), 110. 1892; Dixit, *A Cen. of Indian Pterid.* 22. 1984; Thapa, *Pterid. of Nepal* 33. 2002; Fraser-Jenkins, *Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List* 526. 2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and fern-allies of Nepal I*: 198. 2015.

Osmunda ternate Thunberg, *Fl. Jap.*: 329, t. 32. 1784.

Sceptridium ternatum (Thunberg) Lyon, *Bot. Gaz.* **40**, 458. 1905.

Plants terrestrial, lithophytic, erect, small; rhizomes erect, short, annually producing single frond; 15–25 cm; Sterile lamina stalk 5–12 × 0.2–0.4 cm; ternate, dull green, sub pentagonal, 5–10 × 8–12 cm, herbaceous, glabrous, apex acute; pinnae sub-deltoid, basal ones stalked; segments broadly elliptic, sparsely crenate, apex acute; veins pinnate, free; Sporophore arising 2–4 cm above base of common stipe, 3 pinnate, stalk 12–25 cm; sporangia globose, 0.5–0.7 cm; Spore yellowish, tetrahedral, 33 × 30 μm.

Exsiccatae : West Bengal, Darjiling hills, Mungpoo, 02/08/13, *Nayan Thapa & Dorjay Lama, 190A (SJCBH), 190B (LBH)*, N27°00'27'' and E088°17'33'',

Alt: 1950 ± 12.

Global Distribution: India, Japan, Korea, Nepal, and Vietnam, China.

Local distribution: Mungpoo, Kafer, Deer Park.

Botrychium lanuginosum Wallich ex Hooker & Greville ,Ic.Fil.:1, t.29. 1831; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 102.1965; Thapa, Pterid. of Nepal 32.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 526.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:93.2015.

Botrychium lanuginosum Wallich ex Hooker & Greville *var nepalensis* (Nishida) N.C . Nair & R.D .Dixit, J.Bomb.Nat.Hist.Soc.78(3):447.1981.

Botrypus lanuginosum (Wallich ex Hooker & Greville) Holub *var. nepalensis* (Nishida) S.R. Ghosh, J.Econ. Taxon. BOt.5(1):246.1984.

(Plate 3.7:G,H,I)

Plant terrestrial, medium sized; rhizomes short , erect; Stipes stramineous , 12–30 × 0.3 –0.6 cm, fleshy, hairy; hair white, long, 0.5-1 cm; Sterile lamina 3-4 pinnate, deltoid to sub-pentagonal, 14–45 × 5–25 cm, thin, herbaceous, pubescent; Pinnae 5–8 pairs, alternate, long stalked, 2–6 cm apart, lowest pair largest, 7–20 × 5–10 cm; Pinnules 6–10 pairs, alternate, stalked, basiscopic pinnules larger than acroscopic ones, basal pinnule largest; ultimate lobes acute ; veins free, simple or forked; Sporophore with stalk 2–10 cm, 3 pinnate, hairy, arising between the lowest two pairs of pinnae of sterile lamina; Sporangia globose, brown ,in two rows, on ultimate branches of panicles; Spore, yellowish to pale green, spherical to tetrahedral, 34 × 30 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/11, *Nayan Thapa & Dorjay Lama 024A(SJCBH), 024B(LBH), N27°00'31.7'' and E088°17'37.4''*, Alt: 2154 ± 15.

Global Distribution: Sri Lanka, Bhutan, India, Indonesia, Nepal, Philippines, Sri Lanka, Taiwan.

Local Distribution: Mangwa, Chitrey, Pandam, Alu Bari, Makaibari, Third Mile

Ophioglossum Linnaeus, Sp. Pl. 2: 1062. 1753.

Ophioglossum reticulatum Linnaeus, Sp. Pl. 2: 1063 (1753); Beddome, Ferns Sout. India 23, t.70 .1863; Thapa, Pterid.of Nepal 34.2002; Ghosh., The Pter. Flo. Of East. Ind. I :154.2004; Fraser-Jenkins., Tax. Revi. Of Three Hundred Ind.

Subcon. Pterid. With a revi. Cen. List 527.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:104.2015.

Ophioglossum cordifolium Roxburgh in Griffith, Calc. J. Nat. Hist. 4: 475 .1844.

(Plate 3.7:E,F)

Plants perennial, herbaceous, 10–15 cm tall; rhizomes erect, slender, bearing thick fleshy roots; aerial portion annual, sterile leaf 1-2 per plant, cordate-lanceolate, medially wider, narrower apex, apex acute, margin entire, costa not very prominent; Leaves silvery green-green in color, 1.5-7 × 1.2-3 cm, sessile, peduncle sheathed; stipe cylindrical, 4.2-6 × 0.1-0.2 cm wide; veins reticulate, anastomosing, branched with included veinlets; Fertile segment arising from the base of sterile blade, vertical at right angle to lamina; Peduncle green, rounded in shape, 4.0-6 × 0.1-0.3, bearing 1.7-2.7 × 0.2-0.4 cm broad spike; Sporangia laterally paired, 19-42 per spike; Spores spherical to tetrahedral, 35×30µm, pale-yellowish, trilete, tuberculate.

Exsiccatae : West Bengal, Darjiling hills, Mungpoo, 02/08/13, *Nayan Thapa & Dorjay Lama*, 191A(SJCBH), 191B(LBH), N27°00'27'' and E088°17'33'', Alt: 1950±12.

Global Distribution: Korea, Africa, Madagascar, South America, India, Nepal, Bhutan.

Local distribution: Mungpoo, Shrubbery Park, Murdahatti, Sanchel.

Marattiaceae Bercht & Presl, Prirozen-Rostl. 1:270.1820.

Angiopteris Hoffmann, Commentat. Soc. Regiae Sci. Gott. 12(Cl. Phys.): 29. 1796.

Angiopteris helferiana Presl, Suppl. Tent. Pterid. 22. 1845; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 25.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal 1:105 .2015.

Plants lithophyte, terrestrial, erect; caudex stout, erect; Frond bi-pinnate, 200-300 × 50-70 cm; stipe 50-120 cm, green, glabrous; lamina ovate-lanceolate, shining

green, 150- 180 × 60-90 cm; pinnae base swollen, articulated, alternate, lanceolate, 30-45 × 20-30 cm; pinnules alternate, 15-20 pairs, lanceolate, margin serrate, acuminate, 10-15 × 2-3 cm; veins distinct, forked, false vein present; sori inframarginal, along the veins, brown; sporangium globose, brown, 200-210 μm; spore globose, smooth, brown, 24-27 μm.

Exciccatae : West Bengal, Darjiling hills, Mangwa, 03/04/12, *Nayan Thapa & Dorjay Lama*, 113A(SJCBH), 113B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: Bhutan, India, Myanmar, Nepal.

Local distribution: Mangwa, Takdah, Mungpoo

Osmundaceae Martinov, Tekhno-Bot. Slovar. 445. 1820.

Osmunda Linnaeus, Sp. Pl. 2: 1063. 1753.

Osmunda claytoniana Linnaeus subsp. **vestita** (Wallich ex Milde) Löve & Löve, Taxon **26** (2-3): 324 .1977; Thapa, Pterid. of Nepal 35.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 528.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:110.2015.

Osmunda claytoniana Linnaeus var. *vestita* Wallich ex Milde, Monogr. Gen. Osmund.: 102 (1868),

Osmunda claytoniana Linnaeus, Sp. Pl. **2**: 1066 1753; Beddom., Handb. Ferns Brit. India (with Supl), 469, f. 293. 1883; Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 104 .1964.

Osmunda claytoniana Linnaeus subsp. *pilosa* (Wallich ex Hooker & Greville) Fraser-Jenkins, Pakistan Syst. **5** (1-2): 85-120 .1992.

(Plate 3.7:A,B,C,D)

Plant terrestrial, perennial, herbaceous; rhizome ascending, short; aerial portion annual, fronds sub-dimorphic stipe stramineous, shorter than lamina, 10-15 × 0.4-0.8 cm, pubescent; lamina lanceolate, pinnate, 30-40 × 10-20 cm, round to obtuse; pinnae 15-30 pairs, fertile pinnae 5-7 pairs, in lower middle portion of lamina; sterile pinnae linear-lanceolate, 10-15 × 2-3 cm; ultimate segments entire, naked at margin, or with grayish white to grayish brown hairs when young, apex rounded; fertile pinnae ca. 1/3 length of sterile ones, 0.4-0.6 cm wide, covered throughout with sporangia, globose, 310-325 μm, greenish turning blackish brown; Spores dark green, elliptic, tuberculate, 40-45 μm

Exsiccatae : West Bengal, Darjiling hills, Meghma, 22/07/13, *Nayan Thapa & Dorjay Lama*, 173A(SJCBH), 173B(LBH), N27°01'30'' and E088°05'47.2'', Alt: 2901m±12.

Global Distribution: Korea, India, Nepal, Bhutan, Russia, North America.

Local distribution: Meghma, Tiger hill, Ghoom, Alu bari.

Plagiogyriaceae Bower, Ann. Bot. 40:484.1926.

Plagiogyria (Kunze) Mettenius, Abh. Senckenberg. Naturf. Ges. 2: 265. 1858.

Plagiogyria pycnophylla (Kunze) Mettineus, Farngatt. II: 272 .1858; Beddome, Handb. Ferns Brit. India (with Suppl.) 129.1892; Dixit, A Cen. Of Indian Pterid. 27 .1984; Thapa, Pterid. of Nepal 35.2002; Fraser-Jenkins., Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 529.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:112.2015

Lomaria pycnophylla Kunze, Bot. Zeit. (Berlin) 6: 143 .1848

Plagiogyria communis Ching, Acta Phytotax. Sin. 7: 122, 147, t.35, f.2. 1958.

Plant terrestrial, herbaceous; rhizome erect, hard; Stipes 10-30 cm in sterile fronds, 10-40 cm in fertile fronds, stipes and rachis glabrous to hairy; aerophores elongate, hornlike, apex blunt; Sterile lamina pinnate, 20-80 × 6-45 cm, with an pinna like apical segment; rachis abaxially flattened; pinnae 20-30 pairs; proximal pinnae sessile to shortly stalked, base truncate to rounded; middle pinnae sessile, lower 2-4 pairs of pinnae reduced, veins simple or sometimes 1-forked; Fertile lamina pinnate, narrow, linear with revolute margins, 10-45 × 4-16 cm; sori covering complete under surface of fertile pinnae; sporangium globose, 210-250 μm; spores tetrahedral, smooth, trilete, 27-35 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/11, *Nayan Thapa & Dorjay Lama*, 017A (SJCBH), 017B(LBH), N27°00'31.7'' and E088°17'37.4'', Alt : 2154m ± 15.

Global distribution: Bhutan, N India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines.

Local Distribution: Third mile, Senchel, Chimney, Lava, Alubari, Meghma, Gayribas.

Lygodiaceae C.Presl, Suppl. Tent. Pterid. 98. 1845.

Lygodium Swartz, J. Bot. (Schrader) 1800(2): 7, 106. 1801 (nom. cons.).

1. Fertile segment contracted than sterile segment.....*Lygodium japonicum*
+. Fertile segment of the same size as sterile segment.....*Lygodium flexuosum*

Lygodium flexuosum (Linnaeus) Swartz, Schrad. J. Bot. **1800** (2): 106 (1801); Beddome, Handb. Ferns Brit. India (with Suppl.), 457, t. 283. 1892; Dixit, A Cen. Of Indian Pterid. 60. 1984; Mehra, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 104. 1964; Thapa, Pterid. of Nepal 60. 2002; Ghosh, The Pterid. Flo. Of East. Ind I: 221. 2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Indian Subcon. Pterid. With a rev. Cen. List 530. 2008.

Ophioglossum flexuosum L, Sp. Pl. **2**: 1663 (1753).

Plant terrestrial, twining climber; rhizome shortly creeping, densely covered with roots; fronds 200-350 × 20-40 cm with several pairs of primary rachis terminating in a dormant apex, ca. 0.3 cm and primary rachis branched into pair of secondary rachis branch, 5-12 cm, Secondary rachis branched, branch pinna, palmatiset, finger like lobes, palmately 3-7-lobed, proximal lobe longest 3-7 × 1-3 cm, lateral lobes smaller, 1-3 × 0.5- 1.5 cm, base of pinna cordate, margins serrate; sporophores 0.3-0.5 × 0.1-0.3 cm; sporangium globose, 360-380 μm; spores tetrahedral, trilete, light brown, 35-43 μm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 23/05/2013, *Nayan Thapa & Dorjay Lama*, 131A (SJCBH), 131B(LBH), N27° 04'35 and E088° 25'26'', Alt : 366m ± 19.6

Global distribution: Nepal, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Bhutan, India, Japan, Malaysia.

Local distribution: Teesta, Majitar, Singla, Glenburn.

Lygodium japonicum(Thunberg in Murray) Swartz, Schrad. J. Bot. **1800** (2): 106. 1801; Beddome, Handb.Ferns Brit. India(with Suppl.) 457 .1892; Mehra, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 104.1964;Dixit, A Cen. Of Indian Pterid. 60.984; Thapa, Pterid. of Nepal 60.2002; Ghosh,The Pterid. Flo. Of East.Ind I: 221,2004; Fraser-Jenkins,Tax. Revi. Of Three Hundred Indian Subcon. Pterid. With a revi. Cen. List, 530,2008.

Ophioglossum japonicum Thunb. in A.Murray. Linnaeus Syst. Veg. ed.14: 926 (1784).

(Figure 3.21: A to C)

Plant terrestrial, climber; rhizome creeping, dichotomously branched, clothed with dark brown hairs; Fronds 200-250× 20-40 cm, rachis ca. 0.2cm,dorsal surface pubescent; sterile fronds tri-pinnate, fertile fronds quadripinnate;primary rachis 0.6-0.8 × 0.1-0.3 cm, pubescent; secondary branches 10-25 × 0.1-0.3 cm; articulation of rachis absent; lamina pubescent, midvein and veins pubescent below; ultimate pinnules auricled, deltoid lanceolate; sporophores 0.7-1× 0.1-0.3 cm,brownish; sporangia 4-7 solitary,globose,300-400µm; spores tetrahedral, light brown,colliculate,96-100µm.

Exsiccatae : West Bengal,Darjiling hills, Teesta,07/08/2013, *Nayan Thapa & Dorjay Lama, 192A (SJCBH), 192B(LBH), N27°03'35and E088°25'10''*,Alt :354m ± 14

Global Distribution: Vietnam ,Japan ,Bhutan, India, Indonesia ,Korea , Nepal, Philippines, Sri Lanka; tropical Australia, North America.

Local Distribution: Teesta,Majitar,Singla,Gourbathan.

Gleicheniaceae Presl, Rel.Haenk 1(1):70.1825.

1. Plant stragglng ,fronds 200-500 cm in height..... **Diplopterygium**

+ Plants scrambler, fronds around 100 cm in height.....**Dicranopteris**

Dicranopteris Bernahardi, Schrad. Neu.J.Bot.1(2):38.1905.

1. Dichotomy and apical buds pubescent.....*Dicranopteris lanigera*

+ Dichotomy and apical buds glabrous.....2

2. Presence of deflexed segment at each dichotomous branching
.....*Dicranopteris splendida*

+ Presence of deflexed pinna at each dichotomous
branching.....*Dicranopteris taiwanensis*

Dicranopteris splendida (Hand-Mazz.) Tagawa, Acta Phytotax. Geobot. 8: 164. 1939; Thapa, Pterid. of Nepal 36.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 532.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:128 .2015.

Gleichenia splendida Hand.-Mazz, Akad. Anz. Akad. Wein **19**: 81 .1924.

Dicranopteris ampla Ching & Chiu in Ching & Wang, Acta Phytotax. Sin.**8**: 161 .1959.

Plants terrestrial, scrambler, upto 70- 100 cm tall; rhizome creeping, pubescent, hairs brown, ca. 0.3 cm; Stipe brown, cylindrical, 20– 30 × 0.2-0.4 cm, glabrous; rachis 1-3 times dichotomously branched, apical bud ovate, glabrous; rachis brown, smooth, glabrous; each dichotomy of a rachis bears a deflexed segment, linear-lanceolate, 3-7 × 0.8- 1 cm, ultimate pinnae linear-lanceolate, 15–35 × 5–10 cm, apex attenuate; segment 30–45 on each side, lanceolate, 3-4 × 0.8-1 cm, margin entire, apex obtuse; lamina papery, glaucous abaxially, dark green adaxially, glabrous; costae prominent; veins free, forked; Sori dark brown, scattered; sporangia globose, 200-220 µm; spores hyaline, spherical, 33-37µm.

Exsiccatae : West Bengal, Darjiling hills, Dhotrey, 30/06/13, *Nayan Thapa & Dorjay Lama*, 145A (SJCBH), 145B(LBH), N26⁰ 59' 12.9 and E088⁰ 14' 46.7'', Alt : 1872m ± 12

Global distribution: Myanmar, Thailand, Nepal, India.

Local Distribution: Sukhia, Pasupathi fatak, Takdah.

Dicranopteris taiwanensis Ching & Chui. in Chien & Chun, Fl. Reip. Pop. Sin. **2**: 346 (1959); Thapa, Pterid. Of Nepal 36.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 532.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:128.2015.

Dicranopteris linearis var. *montana* Holttum, Reinw. **4**: 276 .1957.

Plant terrestrial, scrambler, up to 90-100 cm tall; rhizomes creeping, 0.3-0.6 cm in diam.; Stipe dark brown, 30-40 × 0.2-0.4 cm, glabrous; rachis 2 or more times dichotomously branched; apical buds ovate, small; rachis with a first pair of deflexed lateral pinnae at each dichotomy, broadly lanceolate, 7-9 × 3-4 cm, base and apex attenuate; second pair smaller, 3-5 × 0.5-1.5 cm; ultimate pinnae oblong-lanceolate, 15-25 × 4-7 cm, base attenuate, apex acuminate; segments 25-30 on each side, linear-lanceolate, 3-3.5 × 0.4-0.6 cm, margin entire, apex obtuse, papery, glabrous; costae prominent on both surface, veins forked, free; Sori brown, spherical, arranged in single line on each side of the costule; sporangia globose, golden-brown, 180-190 µm, spores light brown, spherical, 29-32 µm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 11/07/11, *Nayan Thapa & Dorjay Lama*, 16A (SJCBH), 16B (LBH), N27°04'13.5'' and E088°15'59.7.7'', Alt : 1659m ± 11.5

Global distribution: China, Taiwan, Nepal, India, Bhutan.

Local distribution: Lebong, Third Mile, Algarah, Payow, Dilaram.

Dicranopteris lanigera (D. Don) Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 35.2008; ; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:125.2015.

Gleichenia lanigera D. Don, *Prodr. Flor. Nepal.*: 17.1824.

Plant terrestrial, scrambler, 80-90 cm tall; rhizomes creeping, 0.3-0.6 cm in diam.; Stipe stramineous, 25-35 × 0.2-0.4 cm, glabrous; rachis 2 or more times dichotomously branched; apical buds ovate, small, pubescent; rachis with a first pair of pinnae at each dichotomy, lanceolate, 5-7 × 1.5-3 cm, base and apex attenuate, apex acuminate; segments 25-33 on each side, linear-lanceolate, 1-1.5 × 0.2-0.4 cm, margin entire, apex obtuse, papery, glabrous; costae prominent on both surface, veins forked, free; Sori brown, spherical, arranged in single line on each side of the costule; sporangia globose, golden-brown, 140-160 μm, spores light brown, spherical, 26-28 μm.

Exsiccatae : West Bengal, Darjiling hills, Rohini, 03/04/12, *Nayan Thapa & Dorjay Lama*, 108A (SJCBH), 108B (LBH), N26°54'10.5'' and E088°20'33.5'', Alt : 850m ± 11.5

Global distribution: China, Taiwan, Nepal, India, Bhutan.

Local distribution: Lebung, Third Mile, Algarah, Payow, Dilaram.

Diplopterygium (Diels) Nakai, Bull. Natl. Sci. Mus., Tokyo. 29: 47. 1950.

Diplopterygium giganteum (Wallich ex Hooker & Bauer) Nakai, Bull. Natl. Sci. Mus., Tokyo. 29: 50. 1950; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 130. 2015.

Gleichenia gigantea Wallich ex Hooker & Bauer, Gen. Fil. t. 39. 1840.

Dicranopteris gigantea Ching, Fl. Reipubl. Popularis Sin. 2: 346. 1959.

Diplopterygium giganteum (Wallich ex Hooker & Bauer) Nakai, Bull. Natn. Sci. Mus. Tokyo 29: 50. 1950.

Plants terrestrial, straggling, 300-350 cm tall; Rhizomes thin, long creeping. Stipes dark brown, smooth, cylindrical, 100-150 × 0.3-0.9 cm, branches to produce two primary rachis and axillary bud, further dichotomous branching for 2 - 3 times; axillary buds ovate, ca 0.2 cm, covered with dense brown hairs; rachis branches

100-150 × 0.2-0.4 cm, bi-pinnatifid, lateral pinnae 23-30 pairs, 25-30 × 1.5-3 cm; ultimate segment, 0.7-1.5 × 0.4-1 cm, oblong-lanceolate, obtuse, hairy on undersurface, veins once forked; sori in single line on each side of costule, medial region, naked with 2-5 sporangia, sporangia globose, golden-brown, 190-200 μm; spore tetrahedral, smooth, grayish, 16-20 μm.

Exsiccatae : West Bengal, Darjiling hills, Chatakpur, 20/10/11, *Nayan Thapa & Dorjay Lama*, 082A (SJCBH), 082B (LBH), N27° 00'35'' and E088°17'15'', Alt : 2121m ± 13.5

Global distribution: Nepal, Bhutan, China, Myanmar, Vietnam, Thailand.

Local distribution: Takdah, Lava, Lebong, Kuresong, Sonada, Algarah.

Hymenophyllaceae Link, Handb. Z. Erken. d. Gewachse 3:36.1833.

1. Sori tubular, 0.6-0.8 × 0.2 cm..... **Trichomanes**

+. Sori bi-valved, 0.3-0.4 × 0.1-0.2 cm..... **Hymenophyllum**

Trichomanes Linnaeus, Sp. Pl. 2: 1097. 1753 (*nom. cons.*).

Trichomanes auriculatum Blume, Enum. Pl. Javae 2:225.1828; Copel. In Philip. Journ. Sci. 5(2).1933; Ghosh, The Pterid. Flo. Of East. Ind. 1:245.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 552.2008.

Trichomanes disactum J. Smith in J. Bot. 3:417.1841.

Lacostea auriculata (Bl.) Prantl, Hymen. 50.1875.

Plants lithophytic; rhizome long, creeping, hairy; hairs blackish-brown, Ca. 0.3 cm long, septate, tip blunt; fronds monomorphic, 24-35 × 6-8 cm, bi-pinnate, oblong-lanceolate; stipe 1.5-2 cm, green, winged, hairy; lamina green, 22-30 × 6-8 cm; pinnae 2-4 × 1-2 cm, staked, widest at base, oblique, cuneate, acute, toothed; veins distinct, forked; sori tubular, receptacle protruding, 0.6-0.8 × 0.2 cm; sporangium sessile, globose, 300-310 μm; spore tetrahedral, smooth, hyaline, 30-40 μm.

Exsiccatae : West Bengal,Darjiling hills, Lebong ,13/09/13, *Nayan Thapa & Dorjay Lama*, 198A(SJCBH), 198B (LBH),N27°04'13.4''and E088°16'59.2'',Alt: 1659m±11.1.

Global Distribution:Bhutan, Cambodia, China,India, Japan, Laos, Myanmar, Nepal, Thailand; Pacific islands .

Local Distribution: Singamari,Lebong ,Ging.

Hymenophyllum Smith, Mém. Acad. Roy. Sci. (Turin) 5: 418, t. 9. 1793.

- 1. Pinnae 6-10 pairs 2
- + Pinnae 4-6 pairs..... *Hymenophyllum tenellum*
- 2. Fronds 5-15 × 2-4 cm *Hymenophyllum exertum*
- + Fronds 16-20 × 4-8 cm*Hymenophyllum badium*

Hymenophyllum badium Hooker & Greville, Ic. Fil.: t. 76, 1828; Beddome, Ferns Brit. Ind. t. 282, 1868; Thapa, Pterid. Of Nepal 58, 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 551, 2008.

Hymenophyllum javanicum Spring *var. badium* (Hooker & Greville) Clarke, Trans. Linn. Soc. Lond. II Bot. 1: 438, 1880.

Mecodium badium (Hooker & Greville) Copel., Philip. J. Sci. 67, 23, 1938.

Plants epiphytic to lithophytic; rhizome creeping, wide, hairy; hairs articulate, brown, Ca. 0.1 cm in diameter; fronds monomorphic, oblong-lanceolate, pinnate, 16-20 × 4-8 cm; stipe 4-6 cm, castaneous; lamina 9-15 × 4-8 cm, pinnae alternate, sessile, 6-8 pairs, 2-4 × 1-2 cm, acuminate, ovate-lanceolate; pinnules 2-5, oblique, sessile, truncate, 0.8-1 × 0.1-0.3 cm, costules winged, crisped; veins distinct, simple, one in each lobe; sori terminal, bivalved, reniform, 0.3 × 0.1 cm; sporangium globose, hyaline, 460-610 μm; spore tetrahedral, hyaline, spinose, 56-66 μm.

Exsiccatae : West Bengal,Darjiling hills, Lebong ,17/09/13, *Nayan Thapa & Dorjay Lama*, 210A(SJCBH), 210B (LBH),N27°04'13.4''and E088°16'59.2'',Alt: 1659m±11.1.

Local Distribution: Lebong,Third mile,chatakpur,alubari

Global distribution: Bhutan, India, Japan, Malaysia, Nepal, Sri Lanka, Vietnam.

Hymenophyllum exsertum Wallich *ex* Hooker, Sp. Fil. 1: 109, t.38a .1844; Beddome, Ferns S.Ind.9,1863; Clarke, Trans.Linn. Soc.ser.2. Bot. 1:438. 1880; Thapa, Pteridophytes of Nepal 58.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 551,2008.

Mecodium exsertum (Wallich *ex* Hooker) Copel., Philip. J. Sci. **67**: 23 .1938.

Hymenophyllum densum WallichCat.n.170.1828.

(Plate 3.8: A to F)

Plants epiphytic to lithophytic; rhizome creeping,long,hairy;hairs 1-3 celled, brown; fronds monomorphic, distant on rhizome,5-15 × 2-4 cm; stipe brown, hairy,wingless,1-2 cm; lamina bipinnate, oblong ,green, membranous; pinnae 6-10 pairs, sessile,ovate-oblong,4-13 × 2-4 cm, decurrent, obtuse; veins distinct, dichotomously branched; sori towards apex of lamina, bi-valved, entire; receptacle small, not protruding, 0.4× 0.2 cm; sporangium, greenish, globose, 250-300µm; spore hyaline-greenish, reniform, papillose, 100×40µm.

Exsiccatae : West Bengal,Darjiling hills, Third mile,01/10/11, *Nayan Thapa & Dorjay Lama*, 075A(SJCBH), 075B (LBH),N27°00'31.4''and E088°17'37.2'',Alt: 2154m±15.2

Global Distribution: Bhutan, Cambodia, India, Laos, Malaysia, Thailand, Vietnam.

Local Distribution:Third milee, Chaudafera,chimney, tonglu.

Hymenophyllum tenellum D.Don.Nepal,Prod.Fl.Nepal.:12,1825; Morton in Contrib. U.S.Nation.Herb.38(6),1973; Fraser-Jenkins.,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 552,2008.

Hymenophyllum polyanthus (Swartz)Sw.,Schrad.J.Bot.(2).1800.

Trichomanes polyanthus Swartz,Prodr.Fl.Ind.Occ.:137.1788.

Plants epiphytic to lithophytic; rhizome thin, creeping, hairy; hairs articulate, brownish; fronds pinnate, 14-18 × 2-4 cm; stipe slender,brown,winged,4-6 cm; lamina 10-12 × 2-4 cm, lanceolate, dark green; pinnae 4-6 pairs,alternate,basal one largest, sessile, oblong, entire, acute, costae prominent, hairy on both surface, 2-4 × 1-1.5 cm; sori bi-valved, toward the apex of lamina, valves entire, 0.3× 0.1 cm, receptacle small, inserted; sporangium globose, hyaline, 460-600µm,spore lunar, -green, papillose, 56-60× 64-70µm.

Exsiccatae : West Bengal,Darjiling hills, Lebong ,17/09/13, *Nayan Thapa & Dorjay Lama*, 207A(SJCBH), 207B (LBH),N27°04'13.4''and E088°16'59.2'',Alt: 1659m±11.1.

Global distribution:Bhutan,China,India,Nepal,Thailand, Taiwan.

Local Distribution: Lebong,Mungpoo.

Cyatheaceae Kaulf, Wesen Farrenkr. 119. 1827.

Cyathea Smith, Mém. Acad. Roy. Sci. (Turin) 5: 416. 1793.

- 1. Scales present on costules, 0.4× 0.3 cm..... *Cyathea brunoniana*
- + Scales absent on costules, glabrous..... *Cyathea spinulosa*

Cyathea spinulosa Wallich ex Hooker, Sp. Fil. 1: 25. 1844; Mehra &Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 124.1965; Dixit , A Cen. of Indian Pterid. 94 .1984; Thapa, Pterid. of Nepal 60.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 557.2008; Fraser-Jenkis, Kandel & Pariyar, Fern & fern Allies of Nepal I:157.2015.

Alsophila spinulosa (Wallich ex Hooker) R. M. Tryon, Contr. Gray Herb. 200: 32. 1970.

Hemitelia decipens (Scott ex Bedd.) Scott in Trans.Linn.Soc.Bot.30:33.t.14,1874.

Plant terrestrial ;trunk 200 - 250 × 25-40 cm, spiny, paleaceous; spine hook shaped, 1-1.5 × 0.2-0.5 cm; palea basifixed, linear , toothed,brown,2-3 × 0.2-0.4 cm;frond 90-160 × 100-130 cm,ovate lanceolate, forming a crown, pinnate ;stipe 30-50 × 2-3 cm,spiney,spines 0.8-1 × 0.1-0.3 cm,purplish; lamina oblong, 40-50 × 14-18 cm; pinnules 16-19 pairs, base cuneate ,sessile, basal pinnules shorter, middle ones lanceolate, 6-10 × 1-3 cm, acuminate , caudate; segments 18-20 pairs, ascending, basal segments shorter,1-2 × 0.6-0.8 c, dentate, scaly abaxially, apex acute; venation distinct, pinnate; sori globose ,brown, indusium half cup shaped;sporangium globose, golden brown,300-310 μm; spore trilete, light brown,43 -47 × 48-50 μm.

Exsiccatae : West Bengal,Darjiling hills, Mirik,18/11/11, *Nayan Thapa & Dorjay Lama*, 098A(SJCBH), 098B (LBH),N26° and E088° 08'30.9'',Alt: 1970m±12.8.

Global distribution: Bangladesh, Bhutan, India, china, Japan, Myanmar, Nepal, Sri Lanka, Thailand.

Local Distribution: Mirik, Dhotrey.

Cyathea brunoniana C.B.Clarke, Trans. Linn. Soc. Lond. II Bot. **1**: 430 .1880; Fraser-Jenkis, Kandel & Pariyar, Fern & fern Allies of Nepal I:149.2015.

Alsophila brunoniana Wallich ex Hooker, Sp. Fil. 1: 52. 1844.

Cyathea chinensis Copel, Philip. J. Sci. 3: 355 .1909; Holttum, Kew Bull. **19**: 466 .1965.

Amphicosmia brunoniana sensu Beddome, handb. Ferns Brit. India: 10 .1883.

(Figure 3.4: A to C)

Plant terrestrial, trunk 250-300 × 40-50cm tall, muricate, castaneous, smooth; fronds pinnate, 100-120 × 130-150 cm, ovate-lanceolate, forming a crown; Stipe purplish, finely warty, muricated; scales pale-brown,oblong-lanceolate,2-3× 0.6-1 cm; lamina oblong, 40-60 × 14-16 cm; pinnules 16-24 pairs, base broad ,sessile, basal pinnules shorter, middle ones lanceolate, 6-12 × 1-4 cm, acuminate , caudate;

segments 18-20 pairs, ascending, basal segments shorter, 1-3 × 0.6-1 cm, dentate, scaly abaxially, bullate, 0.4 × 0.3 cm, hairy, apex acute; venation distinct, pinnate; sori globose, brown, indusium half cup shaped; sporangium globose, golden brown, 210-230 μm; spore trilete, tetrahedral, light brown, 43-50 × 48-52 μm.

Exsiccatae : West Bengal, Darjiling hills, GPO, 27/10/11, *Nayan Thapa & Dorjay Lama*, 097A(SJCBH), 097B (LBH), N26°42'10.2'' and E088°20'30.9'',

Alt: 1970m ± 12.8.

Global Distribution: Bangladesh, China, India, Myanmar, Nepal, Vietnam.

Local Distribution: Takdah, Mangwa, Silari Busty, Dowhill, Gpo.

Dennstaedtiaceae Lotsy, Vortr. Bot. Stammesgesch. 2: 655. 1909.

1. Plants with Perenating bulbils.....**Monosaccharum**
+. Plants without Perennating bulbils.....2
2. Fronds more than 200 cm in height**Pteridium**
+. Fronds less than 200 cm in height.....3
3. Stipe 40-60 cm.....**Microlepia**
+. Stipe 10-40 cm.....4
4. Spore spherical, 35-50 μm..... **Dennstaedtia**
+. Spore bilateral, 43 × 24 μm.....**Hypolepis**

Dennstaedtia Bernhardt, J. Bot. (Schrader). 1800(2): 124. 1801.

1. Fronds bi-pinnate, 30-100 × 10-20 cm..... *Dennstaedtia appendiculata*
2. Fronds tri-pinnate, 30-70 × 10-30 cm..... *Dennstaedtia scabra*

Dennstaedtia appendiculata (Wallich ex Hooker) Smith, Hist. Fil.: 265 (1875); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 116, 1965; Dixit, A Cen. of Indian Pterid. 95, 1984; Thapa, Pterid. of Nepal 80, 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 557, 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159, 2015.

Dicksonia appendiculata Wallich ex Hooker, Sp. Fil. 1:79 (1844).

Emodiopteris appendiculata (Wallich ex Hooker) Ching & Wu in Ching, Acta Phytotax. Sin. 16(4):21 (1978).

(Figure 3.7:A to D)

Plants lithophytic, terrestrial, erect, rhizome thick, erect, fronds bipinnate, herbaceous, 30-100 × 10-20 cm; stipe brown, pubescent, 10-20 cm; lamina lanceolate, finely dissected, 20-80 × 10-20 cm; pinnae 20-30 pairs, opposite, lanceolate, 5-10 × 1-2 cm, basal 3-4 pinnae reduced, 3-6 × 1-2 cm; pinnules 10-20 pairs, opposite, oblong, deeply lobed, acute, pubescent, .5-1 × 0.2-0.4 cm; sori terminal, marginal, indusiate, indusia bivalve; sporangium spherical, brown, 250-300 μm; spore spherical, tuberculate, dark brown, 35-40 μm.

Exsiccatae: West Bengal, Darjilinghills, Lebong, 18/07/11, *Nayan Thapa, 032A (SJCB)*, *032B (LBH)*, N27°04'13.5'' and E088°16'59.7'', Alt: 1659m ± 11.5.

Global distribution: Bhutan, china, india, Nepal, Taiwan

Local Distribution: Third mile, Singamari, Lebong.

Dennstaedtia scabra (Wallich ex Hooker) Moore, Ind. Fil.: 307 (1861); Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 116. 1965; Dixit, A Cen. of Indian Pterid. 95. 1984; Thapa, Pterid. of Nepal 80. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 557. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 161. 2015.

Dicksonia scabra Wallich ex Hooker, Sp. Fil. 1:80 (1844)

Dennstaedtia deltoidea Bedd., Ferns south. India: t. 258 (1863)

Plants lithophytic, terrestrial, erect, rhizome thin, wide, creeping, hairy; fronds tri-pinnate, sub-coriaceous, 30-70 × 10-30 cm; stipe brown, pubescent, 10-20 cm; lamina deltoid, finely dissected, 20-50 × 10-30 cm; pinnae petiolated, 4-7 pairs, alternate, lanceolate, 5-15 × 2-4 cm, basal pinnae largest, 10 × 4 cm; pinnules petiolated, 8-10, pairs, alternate, oblong, deeply lobed, acute, pubescent, 3-5 × 1-2 cm; segments 8-

10 pairs, alternate, sessile, oblong, toothed; sori terminal, marginal, cup shaped indusia; sporangium spherical, brown, 270-300µm; spore spherical, tuberculate, light brown, 45-50µm.

Exsiccatae: West Bengal, Darjiling hills, Third mile, 22/09/11, *Nayan Thapa*, 057A (SJCBH), 057B (LBH), N27°00'31.5'' and E088°17'37.7'', Alt: 2154m±15.
Global Distribution: Bhutan, Burma, China, India, Nepal, Japan, Taiwan.

Local distribution: Third mile, Takdah, Mungpoo, Twelve mile.

Hypolepis Bernhardt, *Neues J. Bot.* 1(2): 34. 1805.

Hypolepis polypodioides (Blume) Hooker, *Sp. Fil.* 2: 64. 1852; Thapa, *Pterid. of Nepal* 80.2002; Fraser-Jenkins, *Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List* 558.2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and fern-allies of Nepal I*: 163.2015.

Cheilanthes polypodioides Blume, *Enum. Pl. Javae* 2: 139. 1828.

Plants lithophytic, terrestrial, erect; rhizome creeping, long, hairy; hairs brown, 0.1-0.2 cm; fronds tri-pinnate, 40-100× 8-26 cm; stipe distant, stramineous, 20-40 cm; lamina deltate-lanceolate, pubescent, pale jointed hairs, 20-60× 8-26 cm; pinnae alternate, basal pair opposite, 10-20 pairs, stalked, oblong-lanceolate, acuminate, 4-13× 2-5 cm; pinnules 20 pairs, alternate, sub-sessile, oblong, deeply lobed, apex rounded, 1-4× 0.4-1.5 cm; ultimate segments opposite, 10 pairs, oblong, entire, apex rounded, 0.2-0.7× 0.1-0.3 cm; sori marginal, circular, brown; sporangium ovoid, dark brown, 300× 253µm; spore bilateral, spinulose, brown, 43× 24µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, *Nayan Thapa & Dorjay Lama*, 150A (SJCBH), 150B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Local distribution: Mangawa, Singla, Gourbathan

Microlepia Presl, Tent. Pterid. 124-125. 1836.

1. Pinnae 16-20 pairs.....*Microlepia speluncae*
- +. Pinnae 10-15 pairs.....*Microlepia rhomboidea*

Microlepia speluncae (Linnaeus)Moore, Ind.Fil.:93(1857); Mehra & Bir , Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 117.1965; Dixit , A Cens. of Indian Pterid. 96.1984; Thapa, Pterid. of Nepal 82.2002; Ghosh, Pterid. Fl. East. Ind. I: 436. 2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:264.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 560.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:178.2015

Polypodium speluncae Linnaeus, Sp.Pl.2:1093(1753)

Davallia villosa Don, Prodr. Fl. Nepal.:10(1825).

Plants lithophytic, terrestrial, erect; rhizome thick, horizontal; Frond tripinnate, 100-200 × 40-50 cm; stipe stramineous, 40-60 cm, pubescent, grey hairs; lamina green, ovate-oblong, 60-140 × 40-50 cm, pubescent; pinnae 16-20 pairs, alternate, 8-10 cm apart, stalked, lanceolate, largest pinnae 18-25 × 6-8 cm, acuminate; pinnules 16-20 pairs, stalked, alternate, lanceolate, 3-4 × 1.5-2 cm; segments 10 pairs, alternate, sessile, oblong, crenate, apex mucronate, basal acroscopic segment largest, 1.5 × 1 cm; sori orbicular, marginal, in sinus, indurated, hairy; sporangium globose, brown, 250-230 μm; spore tetrahedral, hyaline, smooth, 33-35 μm.

Exsiccatae: West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa & Dorjay Lama*, 126A (SJC BH), 126B (LBH), N27°04'40.4'' and E088°25'18.5'',

Alt: 649m ± 14.

Global distribution: Africa, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Singla, Badamtam.

Microlepia rhomboidea (Wallich ex Kunze) Prantl, Arbeiten Königl. Bot. Gart. Breslau. 1: 31. 1892; Ghosh, Pterid. Fl. East. Ind. I: 436. 2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:262.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List. 560.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:175.2015.

Davallia rhomboidea Wallich ex Kunze, Bot. Zeitung (Berlin) 8: 158. 1850.

Davallia polypodides var *rhomboidea* (Wallich ex Kunze) Clarke in Trans. Linn. Soc. London Ser. II. Bot 1:448.1880

Plants lithophytic, terrestrial, erect; rhizome wide, creeping; Frond tripinnate, 100-180 × 20-30 cm; stipe stramineous, 20-60 cm, pubescent; lamina green, ovate, 80-150 × 20-30 cm, pubescent; pinnae 10-15 pairs, alternate, 4-8 cm apart, stalked, lanceolate, largest pinnae 10-15 × 4-6 cm, acuminate; pinnules 14-20 pairs, stalked, alternate, oblong-lanceolate, 3-4 × 1.5-2 cm; segments 6-8 pairs, alternate, sessile, oblong, crenate, apex mucronate, basal acroscopic segment largest, 2 × 1 cm; sori orbicular, marginal, in sinus, induratae, hairy; sporangium globose, hyaline, 278-298 μm; spore tetrahedral, hyaline, smooth, 30-32 μm.

Exsiccatae: West Bengal, Darjiling hills, Lebung, 15/08/11, *Nayan Thapa & Dorjay Lama*, 050A (SJCBH), 050B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1649m ± 11.

Global distribution: Bhutan, China, India, Indonesia, Myanmar, Nepal, Philippines, Vietnam.

Local distribution: Lebung.

Monachosorum Kunze, Bot. Zeitung 6: 119–120. 1848.

Monachosorum henryi Christ in Bull. Herb. Boiss. 6: 869. 1898; H. Ito in Fl. East. Himalayas 1: 463. 1966; Dixit, A Cen. of Indian Pterid. 97. 1984; Thapa, Pterid. of Nepal 79. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 561. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 184. 2015.

Phegopteris subdigitata Sensu Bedd., Handb. Ferns Brit. India: 295. 1883.

Monochosorum subdigittum auct. pl.; dixit, Cens. Indian Pterid.: 97. 1984.

(Figure 3.9: A to D)

Plants lithophytic, terrestrial, erect; rhizome thin, long, creeping, hairy; fronds quadripinnate, 50-100 × 20-40 cm; stipe tufted, 10-20 cm, stramineous, hairy; Lamina deltoid, coriaceous, green, finely dissected, adaxially hairy, hairs multicellular, brown; pinnae 3-8 pairs, alternate, petiolated, lanceolate, acuminate, 10-20 × 6-8 cm, basal pair largest, rachis with bulbils; pinnules alternate 7-11 pairs, petiolated, 1-2 × 0.5-1 cm, ovate-lanceolate; segment alternate, 3-5 pairs, petiolated, 0.3-0.5 × 0.1-0.2 cm, rhomboid, cuneate, margins dentate; sori round, median, subterminal, exindusiate; sporangium globose, golden-brown, 320-3700 μm; spore tetrahedral, hyaline, tuberculated, 38-44 μm.

Exsiccatae: West Bengal, Darjiling hills, Gayribas, 25/10/11, Nayan Thapa & Dorjay Lama, 084A (SJCBH), 084B (LBH), N27°03'20.5'' and E88°01'23.4'',
Alt: 2656 m ± 15.

Global distribution: Bhutan, China, Nepal, India, Taiwan.

Local distribution: Gayribas, alubari, Chaudafera.

Pteridium Gleditsch ex Scopoli, Fl. Carniol. 169. 1760.

Pteridium revolutum (Blume) Nakai, Bot. Mag. (Tokyo). 39: 109. 1925; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 118. 1965; Dixit, A Cens. of Indian Pterid. 98. 1984; Thapa, Pterid. of Nepal 83. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 562. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 185. 2015.

Pteris aquilina sensu Clarke: 468. 1880

Plants terrestrial, erect; rhizome long, creeping, hairy; hairs multicellular, 0.3 × 0.1 cm; fronds tri-pinnate, 100-300 × 40-100 cm; stipe stramineous, hairy at base 40-100 cm; lamina deltate, coriaceous, abaxially pubescent, 60-200 × 40-100 cm; pinnae opposite, 4-6 pair, sessile, lanceolate, basal pair largest, 30-100 × 20-40; pinnules

opposite, 15-20 pairs, sessile, lanceolate, acuminate, 10-20 × 3-4 cm, basal pinnule smallest, 5 × 2 cm; segments opposite, 15-20 pairs, linear, margin infolded, acute, 1.5-2 × 0.3-0.5 cm; veins distinct, forked; sori marginal, linear, indusiate, brown; sporangium ovoid, brown, 200 × 160 μm, spore ovoid, spinulose, pale, 20-25 μm.

Exsiccatae : West Bengal, Darjiling hills, Rohini, 03/04/12, *Nayan Thapa & Dorjay Lama*, 109A (SJCBH), 109B (LBH), N26°54'10.5'' and E088°20'33.5'', Alt : 850m ± 11.5

Global distribution: Bangladesh, Bhutan, China, India, Nepal, Taiwan.

Local distribution: Rohini, Lebong, Badamtam.

Lindsaeaceae Presl ex Schomb., Reis. Brit.-Guiana 3: 883, 1048. 1849.

1. Frond uni-pinnate 10-35 × 2-3 cm..... **Lindsaea**

+ Fronds Quadri-pinnate..... 25-65 × 8-20 cm..... **Odontosoria**

Lindsaea Dryander ex Smith, Mém. Acad. Roy. Sci. (Turin). 5: 413. 1793.

1. Pinnae 15-22 pairs..... *Lindsaea odorata*

+ Pinnae 25-30 pairs..... *Lindsaea himalaica*

Lindsaea himalaica Kramer in Grad. Bull. Singapore 26: 43. f. 3. 1972; Dixit & Ghosh in Proc. Indian Acad. Sci. 92(3): 249. f. 25, 26. 1983; Singh & Panigrahi, Ferns and fern allies of Arunachal Pradesh I: 359. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 562. 2008.

Plants lithophytic, terrestrial; rhizome short, creeping, scaly; scales 0.2-0.6 × 0.1-0.2 cm, lanceolate, entire, acuminate, brown; fronds pinnate, 10-35 × 2-3 cm; stipe castaneous, distant, 2-10 cm; lamina herbaceous, linear-lanceolate, green, 8-25 × 2.3-4.2 cm; pinnae 25-30 pairs, rhomboid, dimidiate, cuneate, margin shallowly lobed, distinct, obtuse, 1.1-2.1 × 0.5-0.8 cm; veins distinct free; sori intra-marginal, oblong, indusiate; sporangium globose, brown, 130-143 μm; spore reniform, smooth, dark brown, 45-50 × 41-44 μm.

Exsiccatae: West Bengal, Darjilinghills, Lebung, 26/10/11, *Nayan Thapa*, 096A (SJCBH), 096B (LBH), N27°04'13.5'' and E088°16'59.4'', Alt: 1659m±11.5.
Global distribution: Bhutan, India.
Local distribution: Lebung, Mungpoo, Algarah.

Lindsaea odorata Roxburgh in Griff., Calc. J. Nat. Hist. 4: 511 (1844); Dixit, A Cen. Of Indian Pterid. 100. 1984; Thapa, Pterid. of Nepal 84. 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 360. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 563. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 193. 2015.

Lindsaea odorata Roxburgh var *darjeelingensis* T. Sen & U. Sen, Amer. Fern J. 61: 14, f. 1-8. 1971.

(Figure 3.11: A to D)

Plants lithophytic, terrestrial; rhizome creeping, scaly; scales 0.3-0.6 × 0.1-0.2 cm, lanceolate, entire, acuminate, brown; fronds pinnate, 15-30 × 2-3 cm; stipe stramineous, distant, 2-7 cm; lamina herbaceous, linear-lanceolate, green, 13-23 × 2-4 cm; pinnae 15-22 pairs, rhomboid, dimidiate, cuneate, margin shallowly lobed, obtuse, 1-2 × 0.5-0.8 cm; veins distinct free; sori at margin, oblong, indusiate; sporangium globose, brown, 135-140 μm; spore reniform, smooth, dark brown, 55-60 × 43-47 μm.

Exsiccatae: West Bengal, Darjilinghills, Third mile, 09/07/11, *Nayan Thapa*, 15A (SJCBH), 15B (LBH), N27°00'31.05'' and E088°17'37.4'', Alt: 2154m±15.

Global distribution: Bhutan, China, India, Nepal, Pacific Islands.

Local distribution: Third mile, Singamari, Lava, Chimney.

Odontosoria Fee, Mem. Foug. 5: 325. 1852.

Odontosoria chinensis (Linnaeus) Smith, Bot. Voy. Herald. 10: 430, 1857; Thapa, Pterid. of Nepal 84. 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 365. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon.

Pterid. With a revi. Cen. List 564.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:195.2015.

Trichomanes chinense Linnaeus, Sp. Pl. 2: 1099.1753.

Adiantum chusanum Linnaeus, Sp. Pl. 2:1095.1753.

(Figure 3.10:A to D)

Plants lithophytic, terrestrial, erect; rhizome short, cylindrical, scaly; scales 0.3-0.5 × 0.1 cm, linear, narrow like hair, 1-2 celled thick; fronds ovate-lanceolate, 25-65 × 8-20 cm; stipe glabrous, lustrous, castaneous, 10-20 cm; lamina quadripinnate, dull-green, finely dissected; pinnae 8-15 pairs, alternate, ovate-lanceolate, basal pair largest, 3-11 × 1-5 cm; pinnules alternate, 3-5 pairs, 2.5-3 × 1-2 cm; ultimate segment truncate, base cuneate; 0.4-0.6 × 0.1-0.2 cm; veins distinct, forked; sori marginal, terminal, cup shaped, indurated; sporangium round, brown, 130-140 μm; spore reniform, brown, smooth, 48-53 × 33-36 μm.

Exciccatae: West Bengal, Darjilinghills, Third mile, 14/09/13, *Nayan Thapa, 199A (SJCBH), 199B (LBH), N27°00'31.05'' and E088°17'37.4''*, Alt: 2154 m ± 15.

Global distribution: Bangladesh, Bhutan, China, India, Japan, Korea, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Third mile, Takdah, Singamari.

Pteridaceae Kirchn, Schul.-Bot. 109. 1831.

1. Fronds 20-100 × 10-30 cm.....2
- + Fronds 5-300 × 2-90 cm.....5
2. Pinnae with farina, 2-6 × 1-4 cm.....3
- + Pinnae without farina, 8-16 × 2-4 cm.....4
3. Pinnules 10-16 pairs.....**Pityogramma**
- + Pinnules 3-4 pairs.....**Aleuritopteris**
4. Stipe black, shiny lustrous, 5-10 cm.....**Adiantum**
- + Stipe stramineous to castaneous, dull, 20-30 cm.....**Pteris**

- 5. Stipe 2-4 cm.....**Cerosora**
- + Stipe 10-100 cm.....5
- 6. Spore bilateral, 40-50× 30-40µm.....**Onychium**
- + Spore tetrahedral, 40-50µm.....**Coniogramme**

Adiantum Linnaeus, Sp. Pl. 2: 1094. 1753.

- 1. Plants unipinnate, 20-40 cm in height.....2
- + Plants tripinnate to quadripinnate, 50-90 cm in height.....3
- 2. Ultimate segment with stipe and glabrous.....*Adiantum philiphense subsp philiphense*
- + Ultimate segment sessile and pubescent.....*Adiantum incisum*
- 3. Sori 8-10 in ultimate segment.....*Adiantum concinnum*
- + Sori 1-3 in ultimate segment.....*Adiantum venustum*

Adiantum concinnum Humb. & Bonpl. ex Willd., Sp. Pl., ed. 4 [Willdenow] 5: 451.1810; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 578.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 34.2015.

Adiantum lutescens Moug. ex Fée Mickel, Mémoires sur les Familles des Fougères 5: 119. 1852.

Plants lithophytic; rhizome creeping, long, scaly; scales lanceolate, brown, 0.6-1 × 0.3-0.5 cm, acuminate, entire; fronds ovate-deltate, 50-90 cm, 3 pinnate, yellowish-green, shiny; lamina ovate to deltoid, 20-40 × 5-20 cm; stipe scaly at base, chestnut, glossy, 5-10 cm; pinnae 6-8 pairs, alternate, 3-10 × 1-5 cm; ultimate pinnules stalked, fan shaped, rhomboid, base cuneate, upper margin notched, 1-2 × 0.5-1.8 cm; sori 6-9, reniform, along the upper margin, indusium false; sporangium golden brown, globose, 283-330 μm; spore tetrahedral, brown, 43-47 × 39-41 μm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa & Dorjay Lama*, 129A(SJCBH), 129B (LBH), N27°04'40.4'' and E088°25'18.2'', Alt: 649m ± 14.1.

Global distribution: India, South America.

Local distribution: Ging, Lopchu, Teesta.

Adiantum incisum Forssk., Fl. Aegypt. Arab.: 187 .1775; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 105.1965; Dixit, A Cen. of Indian Pterid. 75 .1984; Thapa, Pterid. of Nepal 62.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 288.2004;

Adiantum caudatum sensu Bedd., Ferns South. India: t.2 (1863), 83, t.44 (1883), non L.

Plants lithophytic; rhizome erect, scaly; scales brown, lanceolate, acuminate, 0.8-1 × 0.2-0.4 cm; fronds pinnate, lanceolate, 10-30 × 2-4.5 cm; stipe chestnut, shining, scaly at base; rachis hairy, ultimate end with rooting buds; pinnae green, lobed at acroscopic side, cuneate, sessile, hairy, 10-20 pairs, alternate; sori 2-4, linear, covered by false indusium, marginal, greyish; sporangium globose, golden-brown, 280-290 μm; spore tetrahedral, brown, 35-40 × 43-46 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 18/07/11 *Nayan Thapa & Dorjay Lama*, 030A(SJCBH), 030B(LBH), N27°01'16.4'' and E088°16'24.2'', Alt: 1586m ± 18.3.9.

Global distribution: Bhutan, China, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Local Distribution: Rungdung, single, Teesta, peshok, Ging.

Adiantum philippense Linnaeus subsp. **philiphense** Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 578.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 214.2015.

Adiantum lunulatum Burm.f., Fl. India: 235, 1768.

Plants lithophytes; rhizomes erect, scaly; scales brown, lanceolate, margins denticulate, acuminate; 0.5-0.8 × 0.2-0.3 cm; Fronds tufted, 10-50 × 3-8 cm, pinnate, lanceolate; stipe chestnut, shining, lustrous black; pinnae 2-4 × 1.2-1.8 cm, green, alternate, 7-16 pairs, lunulate to reniform, base cuneate, stalked; rachis chestnut coloured, glabrous, shining; veins forked, distinct, reaching the margin; sori 2-5, along the margin, linear, false indusium, entire, brown; sporangium globose, dark brown, 390-410 µm; spore tetrahedral, alveolate, brown, 46-50 × 48-54 µm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 18/07/11 *Nayan Thapa & Dorjay Lama*, 029A (SJCBH), 029B (LBH), N27°01'16.4'' and E088°16'24.2'', Alt: 1586m ± 18.3.

Global distribution: Bhutan, China, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Local Distribution: Rungdung, single, Teesta

Adiantum venustum Don, Prodr. Fl. Nepal, 17, 1825; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 106.1965; Dixit, A Cen. of Indian Pterid. 76.1984; Thapa, Pterid. Of Nepal 62.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 295.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 579.2008; Fraser-Jenk., Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 223.2015.

(Plate 3.17: A to E)

Plants lithophytes; rhizome short, creeping, scaly; scales dense, brown, ovate-lanceolate, margins entire, 0.6-1 × 0.2-0.4cm; Fronds deltate-ovate, shining green, 30-60 × 10-20 cm; stipe chestnut, shining, glabrous, 5-10 cm; lamina 3-4 pinnate, broadly ovate in outline, 10-38 × 10-20cm; pinnae 8-10 pairs, alternate, basal pair largest; pinnules stalked, ovate, cuneate, teeth present, 0.7-1.2 × 0.5-1cm; sori 1-3 in pinnules, notched, black, indusium false, thick, reniform; sporangium globose, brown, 360-380µm; spore tetrahedral, alveolate, light brown, 36-40 × 28-32µm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 04/05/11 *Nayan Thapa & Dorjay Lama*, 010A(SJCBH), 010B (LBH), N27°00'31.7'' and E088°17'37.2'',

Alt: 2154m±15.

Global Distribution: Bhutan, China, India, Myanmar, Nepal.

Local Distribution: Third mile, Senchel, Alubari, Lava.

Aleuritopteris Fée, Mém. Fam. Foug. 5 Gen. Fil.: 153. 1852.

1. Plant more than 20 cm in height.....2
- + Plants less than 20 cm in height.....4
2. Costa and costules scaly..... *Aleuritopteris albomarginata*
- + Costa and costules glabrous.....3
3. Lamina as long as stipe..... *Aleuritopteris bicolor*
- + Lamina half to one third the length of the stipe..... *Aleuritopteris subdimorpha*
4. Abaxially lamina with yellow farina..... *Aleuritopteris chrysophylla*
- + Abaxially lamina with white farina..... *Aleuritopteris formosona*

Aleuritopteris albomarginata (Clarke) Ching, Hong Kong Naturalist. 10: 109, 1941; Ghosh, The Pterid. Flo. Of East. Ind., I, 401, 2004 Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List, 564, 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 226. 2015.

Cheilanthes albomarginata Clarke, Trans. Linn. Soc. London, Bot. 1: 456, 1880;

Cheilanthes farinosa (Forsskål) Kaulfuss var. *albomarginata* Bedd. Handb. with suppl. 22, 1892.

(Plate 3.10:F)

Plant lithophytic, herbaceous; rhizomes erect, short, scaly; scales bicolorous, black with pale margins, lanceolate, 0.6-1 × 0.2-0.5 cm; Fronds monomorphic, clustered, 10-40 × 4-10 cm; Stipe chestnut coloured, lustrous, 4-10 × 0.1-0.3 cm, scaly; scales dark brown, bicolorous, conspicuous with lighter margins, lanceolate; Lamina ovate-deltoid, subcoriaceous, bipinnate, basal part of frond tripinnatifid, adaxial surface glabrous, abaxial surface with white-yellow farina, 6-30 × 4-10 cm; pinnae 3-5 pairs, sessile, basal pair of pinnae ovate-deltoid, bipinnatifid, costae with scales abaxially; pinnules 6-8 pairs, basal basispic pinnules larger than adjacent acroscopic ones, 2-3 cm × 0.3-1 cm, lanceolate, pinnatifid; Sori marginal in ultimate segment, interrupted, fimbriate indusia; sporangium globose, brown, 350-370 μm; spore spherical, trilete, dark brown, smooth, 60-64 μm.

Exsiccatae : West Bengal, Darjiling hills, Alubari, 27/05/13, *Nayan Thapa & Dorjay Lama*, 135A(SJCBH), 135B (LBH), N27°00'27.4" and E088°17'29.5", Alt: 2203m±11.

Global distribution: Bhutan, China, India, Nepal, Pakistan.

Local Distribution: Alubari, Senchel, lava, chimney.

Aleuritopteris bicolor (Roxburgh) Fraser-Jenkins in Ind. Fern Gaz. 18(3). 2008; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 565. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 232. 2015.

Pteris bicolor Roxb. in Griff., Calc. J. Nat. Hist. 4: 507. 1844.

Aleuritopteris kathmandunensis Ching & Wu in C.Y. Wu, Acta Bot. Soc. 74: 185. 1995.

Plants lithophytic, terrestrial; rhizome short, erect, Ca. 0.8 cm in diam., fronds 15-45 × 4-12 cm, deltate-ovate, bi-pinnate; stipe 8-16 cm, purplish-brown, scaly; scales bicolorous, dark streak at center with pale margins, linear, 0.2-0.4 × 0.1-0.2 cm; lamina as long as the stipe, 7-29 × 4-12 cm, coriaceous, adaxially green, abaxially with white farina; pinnae 4-8 pairs, sub-opposite, basal pinnae largest, deltate, 2-6 × 1-4 cm, upper pinnae lanceolate; pinnules sessile, lanceolate, deeply lobed, basispic pinnule of basal pinnae pair largest, 1.5-3 × 0.5-1.5 cm; sori marginal, indusiate; sporangium brown, globose, 225-230 μm, spores globose, trilete, pale-brown, 33-37 μm.

Exsiccatae : West Bengal, Darjiling hills, Singla, 23/07/13, *Nayan Thapa & Dorjay Lama*, 182A(SJCBH), 182B (LBH), N27°06'45.8" E088°16'31"; Alt 335±14

Global distribution: Bangladesh, Bhutan, China, India, Nepal, Sri Lanka Myanmar; Thailand, Laos.

Local distribution: Singla, Teesta.

Aleuritopteris chrysophylla (Hooker) Ching, Hong Kong Naturalist. 10: 201. 1941; Ghosh, The Pterid. Flo. Of East. Ind. I: 391. 2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 565. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 236. 2015.

Cheilanthes chrysophylla Hook, Sp. Fil. 113. 1852

Cheilanthes argentea var. *chrysophylla* Hooker Exot. Fern t. 95, f. 1, 6, 7, 8. 1859.

(Plate 3.10:E)

Plants lithophytic, herbaceous, erect; rhizomes erect, short, scaly; scales concolorous, dark brown, linear-lanceolate, 0.2-0.4 × 0.6-0.8 cm; Fronds monomorphic, bi-pinnate, clustered, 5-16 × 3-6 cm; Stipe castaneous, lustrous, 2-6 × 0.1-0.2 cm, sparsely scaly, scales concolorous, dark-brown, linear-lanceolate; lamina ovate-deltoid, 3-10 × 2-5 cm, papery, adaxially glabrous, abaxially golden-yellow, pinnae 3-5 pairs, sub-opposite, sessile, basal pair largest, triangular, pinnatifid; pinnules 3-4 pairs, alternate, lanceolate, deeply lobed; basal basisopic pinnule largest; Sori marginal in ultimate segment, indusial continuous, crenate; sporangium globose, brown, 140-160 μm; spore spherical, trilete, brown, smooth, 40-54 μm.

Exsiccatae : West Bengal, Darjiling hills, Gayribas, 25/10/11, *Nayan Thapa & Dorjay Lama*, 093A (SJCBH), 093B (LBH), N27°02'27.4'' and E088°04'52.5'', Alt: 2503m ± 11

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Gayribas.

Aleuritopteris formosana (Hayata) Tagawa, Acta Phytotax. Geobot. 14: 191. 1952; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With

a revi. Cen. List 565.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:241.2015.

Cheilanthes formosana Hayata, Enum. Pl. Formosa, 612. 1906 .

Cheliantes anceps Blanf. var. *brevifrondis* Khullar & Mehra.Res. Bull.punjab Univ.n.s 23(3-4):189.1972.

(Plate 3.10: A to D)

Plant Lithophytic, herbaceous, erect; rhizomes short, erect, scaly; scales bicolorous, black with pale brown margins, narrowly lanceolate, 0.4-0.8 × 0.2-0.4 cm; Fronds in tufts, clustered, pinnate, 5-20 × 2-8 cm; Stipe chestnut, lustrous, 2-6 cm, scaly, scale bicolorous, lanceolate. Lamina oblong-lanceolate, 3-12 × 3-8 cm, bipinnatifid, papery when dry, abaxially with white farina, adaxially glabrous, bulged; pinnae 4-7 pairs, opposite, basal pair largest, triangular, 1.5-4 × 0.5-1.5 cm, upper pinnae lanceolate, shorter, narrower; pinnules oblong, deeply lobed, 0.5-1.5 × 0.2-0.8 cm; sori marginal, brown, interrupted by false indusia with lacinate margins; sporangium brown, globose, 210-250 μm; spore globose, pale brown, trilete, smooth, 35-45 μm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 18/07/11, *Nayan Thapa & Dorjay Lama*, 031A(SJCBH), 031B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659m ± 11.5.

Global Distribution: Bhutan, China, India, Kashmir, Nepal, Pakistan, Philippines, Thailand.

Local distribution: Lebong, Ging, kuresong.

Aleuritopteris subdimorpha (Clarke & Baker)Fraser-Jenk. in Ind.Fern Gaz.18(3),2008; ; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 566.2008;Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:249.2015.

Cheliantes farinose var sudimorpha Clarke & Bak., J.Linn.Soc.Bot.24:411.1888.

Aleuritopteris longipes Ching et S.K. Wu, Acta Bot. Yunnanica 5(2):165, t.1.f.1-4.1983.

Plants lithophytic, herbaceous; rhizome thick, erect, Ca. 0.8 cm in Diamm.; Fronds 20-55 × 4-12 cm, coriaceous, pentagonal; stipe 15-35 cm, twice the length of lamina, chestnut coloured, lustrous, scaly at base, scales bicolourous, lanceolate, attenuated apices, concolorous, yellowish-red, 0.4-0.8 × 0.2-0.4 cm; lamina short, deltate; 5-20 × 4-16 cm, coriaceous, abaxially with white farina; pinnae 4-8 pairs, sub-opposite, lowest pinnae much longer; lowest basal basiscopic pinnule longest, 3-5 × 0.8-1 cm; ultimate segment deeply lobed, 0.8-1 × 0.2-0.5 cm; sori marginal, indusia sub entire; sporangium globose, golden-brown, 320-330 μm; spores spherical, trilete, pale brown, 38-42 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 24/09/11, *Nayan Thapa & Dorjay Lama*, 064A (SJCBH), 064B (LBH), N27°01'16.4" and E088°16'24.5", Alt: 1586m ± 18.3

Global distribution: Bhutan, Bangladesh, Myanmar, Thailand, China, Laos, Vietnam.

Local distribution: Rungdung

Cerosora (Baker) Domin, Acta Bot. Bohem. 8: 3. 1929.

Cerosora microphylla (Hooker) Tryon, Amer. Fern J. 76 (4): 185. 1986; Thapa, Pterid. of Nepal 63.2002; Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 567.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 259.2015.

Gymnogramme microphylla Hook, Ic. Pl. 10: t. 916. 1854.

Grammitis microphylla Bedd, Ferns Brit. India: t. 148. 1866.

Anogramma microphylla (Hooker) Diels in Engl. & Prantl, Nat. Pfl.-Fam. 1 (4): 259. 1899.

Idiogramma microphylla (Hooker) Ghosh, J. Econ. Taxon. Bot. 4 (3): 982. 1983.

(Plate 3.19: A to C)

Plants lithophytic, herbaceous, erect; rhizome short, scaly; scales blackish, Ca. 0.1 cm in Diam. ; Fronds clustered, tri-pinnate, 5-10 × 2-4 cm; stipe brown, 2-5 × 0.1-0.3 cm, scaly; lamina green, ovate-deltoid, 2-5 × 2-4 cm; Pinnae 5-7 pairs,

basal pair largest, ovate-deltoid, 1– 2 × 0.7–1.2 cm, stalked; Ultimate segments elliptic, base cuneate, margin entire, apex obtuse; veins distinct, sori elliptic, yellowish; sporangium globose, dark brown, 350-400µm; Spore tetrahedral, brown, 45-55µm.

Global Distribution: China, Bhutan, India, Myanmar, Nepal.

Local Distribution: Meghna

Exsiccatae : West Bengal, Darjiling hills, Meghna, 25/10/11 *Nayan Thapa & Dorjay Lama*, 089A(SJCBH), 089B (LBH), N27°00'31.4'' and E088°17'36.2'', Alt: 2153m±11.

Coniogramme Fée, Mém. Fam. Foug. 5 Gen. Fil. 167. 1852, *nom. Cons*

1. Basal pinnae largest, pinnate dentate at margin..... *Coniogramme procera*

+. Basal pinnae smaller, pinnae serrated at margin..... *Coniogramme serrulata*

Coniogramme procera Fée, Mem. Soc. Sci. Nat. Strasbourg **6** (1): 22 .1865; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 111.1965; Dixit, A Cen. of Indian Pterid. 78 .1984; Thapa, Pterid. of Nepal 68.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 408.2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 319.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 568.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 269.2015.

Coniogramme subchordata Copeland, Leaflets Philip. Bot. **3**: 823 .1910.

Grammitis procera Wallich, List no. 3 (1828), *nom. nud.*

Syngramme fraxinea (D. Don) Beddome, Handb. Ferns Brit. India: 386 .1883..

Plants terrestrial, erect; rhizome creeping, thick, 2-4 cm in diam.; Fronds 100-300 × 50-90 cm, tri-pinnate at base, bi-pinnate upwards; stipe 50-100cm, castaneous; pinnae 5-12 pairs, basal pair largest, pinnate, 25-50 × 15-35 cm, lanceolate; segments lanceolate, 5-12 pairs, stalked, truncate, margins dentate, apex caudate;

veins distinct, forked; sori linear, exindusitae; sporangium globose, brownish, 340-360µm; spore tetrahedral, 40-50µm, brown, smooth.

Exsiccatae : West Bengal, Darjiling hills, Meghma, 04/08/11 *Nayan Thapa & Dorjay Lama*, 042A(SJCBH), 042B (LBH), N27°00'23.4'' and E088°03'30.5'', Alt: 2803m±11.

Global distribution: Bhutan, China, India, Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Meghma, Third mile.

Coniogramme serrulata (Blume) Fée, Gen. Fil.: 167, t.14b, f.2 .1850; Dixit , A Cen. of Indian Pterid. 78 .1984; Thapa, Pterid. of Nepal 69.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 408.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 569.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159.2015.

Gymnogramma serrulata Blume, Enum. Pl. Javae 2: 113. 1828.

Coniogramme serra Fée, Mém. Fam. Foug. 5 Gen. Fil. 167, t. 14 B, f. 1. 1852.

Plants terrestrial, erect; rhizome wide, creeping; fronds 45-90 × 15-30 cm, uni-pinnate, basal pinnae bi-pinnate, deltate, ovate, abaxially green, adaxially pubescent, grayish-green; stipe 20-30 cm, stramineous, sclay at base; Pinnae 2- 6 pairs, simple, lanceolate, basal pair pinnate, 10-25 × 2-4.2 cm, base truncate, margins serrate, acuminate, veins forked; Sori linear, exindusiate; sporangium brown, spherical, 350-376µm, spore 40-45µm, tetrahedral, light brown, smooth.

Exsiccatae : West Bengal, Darjiling hills, Mungpoo, 26/10/11 *Nayan Thapa & Dorjay Lama*, 090A(SJCBH), 090B (LBH), N27°00'32.4'' and E088°17'37.5'', Alt: 2148m±9.

Local distribution: Mungpoo, Gorkhey, Chaudafera, Patliyabas.

Global distribution: China, Indonesia, Nepal, Philippines

Onychium Kaulf., Berlin. Jahrb. Pharm. Verbundenen Wiss. 21: 45. 1820.

1. Sori 1.5-2 cm in length with yellow farina *Onychium siliculosum*

+. Sori less than 1 cm in length with white farina... *Onychium vermae*

Onychium vermae Fraser-Jenkins & Khullar in Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal 1:300 .2015

Plants terrestrial, erect; rhizome long, creeping, scaly; scales brown, brown, 0.8-1 × 0.1-0.3 cm, lanceolate, entire, acuminate; Fronds 10-50 × 6-14 cm, quadripinnate, shining green, coriaceous; stipe 10-18 cm, stramineous; pinnae 4-9 pairs, alternate, basal pinnae tripinnate, deltoid, upper lanceolate; Ultimate segments stalked or sessile, rhomboid, acute, 0.5-1 × 0.2-0.4 cm, veins free; sori elongated, brown, indusiate, 0.4-0.7 cm; sporangium globose, brown, 320-340 μm; spore bilateral, 58 × 40 μm, pale, with irregular marking.

Exsiccatae : West Bengal, Darjiling hills, Chatakpur, 01/10/11 *Nayan Thapa & Dorjay Lama*, 076A(SJCBH), 076B (LBH), N27°00'43.2'' and E088°17'30.2'', Alt: 2253m ± 15.2

Global Distribution: Bhutan, China, India, Indonesia, Japan, Korea, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam.

Local Distribution: Chatakpur, Tonglu, Alubari.

Onychium siliculosum (Desv.) Christ, Ind. Fil.: 468 (1906); Itô: 464 (1966); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 108.1965; Dixit, A census of Indian Pterid. 67 .1984; Thapa, Pterid. of Nepal 71.2002; Ghosh, Pterid. Fl. East. Ind. I: 362.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 570.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal 1:297 .2015

Pteris siliculosa Desv., Berl. Mag. **5**: 324 .1811.

Plants lithophytic, erect; rhizomes erect, short, scaly; scales dark brown, lanceolate, 0.8-1 × 0.4-0.6 cm; Fronds tripinnate to quadripinnate, 20-80 × 6-26 cm; slightly dimorphic; stipe tufted, 13-40 cm long, scaly at base; Lamina 7-40 × 6-26 cm, sterile lamina dissected finely, fertile lamina less dissected; Pinnae 6-12 pairs, alternate, ascending, lowest pair largest, 6-10 × 3-6 cm; ultimate segments 1-2 × 0.4-1 cm in fertile fronds, sterile pinnule spatulate, 0.8-1.4 × 0.2- 0.6 cm; sori marginal, entire

abaxially, yellowish; sporangium golden brown, 330-356 μ m; spore bilateral, pale, with irregular marking, 50 \times 30 μ m.

Exsiccatae: West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa*, 130A (SJCBH), 130B (LBH), N27°04'40.05'' and E088°25'18.26'', Alt: 366m \pm 9.

Global distribution: Bangladesh, Bhutan, Cambodia, China, India, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam.

Local Distribution: Teesta, single, Sevoke, Samsing.

Pityrogramma Link, Handb. Erken. Gewäsche [Link] 3: 19. 1833.

Pityrogramma calomelanos (Linnaeus) Link, Handbuch. 3: 20. 1833; Thapa, Pterid. of Nepal 72.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:328.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 361.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal 1:303 .2015.

Acrostichum calomelanos Linnaeus, Sp. Pl. 2: 1072. 1753.

Gymnogramma calomelanos (Linnaeus) Kaulfuss, Enum. Fil.:76.1824.

Plants terrestrial, erect; rhizome ascending, sub-erect, scaly; scales lanceolate, entire, acuminate, brown, 0.6-0.8 \times 0.1-0.2 cm; fronds monomorphic, bi-pinnate, 40-100 \times 10-20 cm; stipe purplish, shiny, lustrous, 20-40 cm; lamina oblong-lanceolate, acuminate, abaxially with white farina; pinnae 10-12 pairs, alternate, stalked, lanceolate, acuminate, 5-10 \times 1.5-3 cm; pinnules 10-16 pairs, alternate, sessile, lanceolate, margin crenate, acuminate, 1-1.5 \times 0.3-0.5 cm; veins hidden, pinnate; sori scattered abaxially on pinnules, white farinose, exindusiate; sporangium ovoid, dark brown, 400 \times 350 μ m; spore tetrahedral, reticulate, brown 45-50 μ m.

Exsiccatae : West Bengal, Darjiling hills, Singla, 23/07/13, *Nayan Thapa & Dorjay Lama*, 181A (SJCBH), 181B (LBH), N27°06'45.8'' E088°16'31''; Alt 335 \pm 14

Global distribution: China, Cambodia, Laos, Nepal, Vietnam.

Local distribution: Singla, Teesta

Pteris Linnaeus, Sp. Pl. 2: 1073. 1753.

1. Pinnules with costal aeroles....2
- + Pinnules without costal aeroles.....3
2. Fronds pedate more than 1m in height..... 14
- + Fronds pinnate less than 1m in height.....13
3. Fronds dimorphic.....4
- + Fronds monomorphic.....6
4. Pinnae bifid.....5
- + Pinnae simple.....*Pteris venusta*
5. Pinnules present.....*Pteris ensiformis*
- + Pinnules absent..... *Pteris cretica*
6. Fronds tripartiate.....*Pteris longipes*
- + Fronds not tripartiate.....7
7. Costa and costule prominently spinose....8
- + Costa prominently spinose.....9
8. Basal pinnae with 2-4 pinnules on basiscopic side.....*Pteris spinescens*
- + Basal pinnae with single pinnules on basiscopic side.....*Pteris medogensis*
9. Basal pair of pinnae smallest in size.....*Pteris vittata*
- + Basal pair of pinnae largest in size.....10
10. Acroscopic margin of pinnae entire.....*Pteris semipinnata*
- + Acroscopic margin of pinnae lobed.....11
11. Stipe stramineus and rough in texture.....*Pteris scabririgens*
- + Stipe castaneus and smooth in texture.....12

12. Pinnae 10 -18 pairs.....*Pteris aspericaulis*
 +. Pinnae 4-5 pairs.....*Pteris puberula*
13. Costal aerole 0.4 × 0.3 cm.....*Pteris biaurita* subsp. *walkeriana*
 +. Costa aerole 0.4 × 0.1cm..... *Pteris biaurita* subsp. *fornicata*
14. Costules hairy.....*Pteris austrosinica*
 +. Costule glabrous..... *Pteris wallichiana*

Pteris austrosinica (Ching) Ching, Acta Phytotax. Sin. 10: 302. 1965.

Pteris wallichiana J. Agardh var. *austrosinica* Ching, Bull. Dept. Biol. Sun Yatsen Univ. 6:27. 1933.

(Figure 3.5: A to E)

Plants terrestrial, erect, ca. 2 m tall; rhizome erect, short, thick, ca. 2.5 cm in diameter; Fronds clustered, stipe castaneous, up to 1.5 m, ca. 2 cm in diameter, glabrous, broadly grooved adaxially; Rachis chestnut coloured, narrowly grooved adaxially; Lamina usually 3-pinnatipartite, pentagonal-broadly ovate in outline, 90 – 120 × 90 cm, main central branch, 75 – 85 cm, peripheral branches 25 cm wide, stalked (8 – 10 cm), lateral branches smaller, usually again divided; lateral pinnules 14 – 20 pairs, alternate, decumbent, sessile or slightly shortly stalked, basal several pairs slightly shorter, ca. 1.5 cm apart, middle pinnules lanceolate, 15 – 20 × 3 – 4 cm, base broadly cuneate, nearly symmetrical, deeply pectinately divided leaving broadly winged costule, apex shortly linear-caudate; segments 22 – 30 pairs, alternate, sinuses obtuse-acute, 0.3 – 0.55 cm wide, slightly decumbent, falcate-lanceolate, 2-2.5 × ca. 0.3 cm, basally enlarged, apex shortly acuminate, sterile apex obtusely dentate; terminal pinnules similar to median lateral pinnules, stalked (ca. 1 cm); costules straw-colored, glabrous with short spines on both sides of adaxial groove; veins conspicuous, oblique, anastomosing to form a series of narrow areoles along costa, several simple veinlets reaching incision in outer edge of arcuate vein, and veinlet free outward from areole, and basal veinlet of segment 2-forked at base; lamina brown-green, papery when dried, below with brown slender multicellular hairs.

Exsiccates: West Bengal, Darjiling hills, Singla, 24.06.2013, *Nayan Thapa & Dorjay Lama*, 250A (SJCBH),LB-014240.

Global Distribution: China (Guangdong, Guangxi, Jiangxi) and now in India.

Local Distribution: Singla (N27° 06'45.8'' EO88° 16'31''; Altitude 335±14 m)

Pteris biaurita Linnaeus subsp. ***fornicata*** Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 116.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:316.2015.

Campteria biaurita Hooker, Gen. Fil.: t.65A,1841.

Pteris pectinata D.Don, Prodr. Fl. Nepal.: 15, 1825.

Plants terrestrial, erect; rhizome short, erect, scaly; scales bicolorous, dark brown at centre, margins pale, lanceolate, 0.4-0.6 × 0.1-0.2 cm; fronds bipinnate, 50-90 × 10-40 cm; stipe 15-25 cm, stramineous, glabrous; lamina ovate-lanceolate, sub-coriaceous, 20-65 × 10-40 cm; pinnae 5-12 pairs, opposite, basal pinnae forked, lanceolate, sessile, apex acuminate, 5-20 × 2-4 cm, upper pinnae gradually reducing; pinnae lobed, lobes or segments 14-20 pairs, oblong, obtuse; veins prominent, distinct, 16-20 pairs, basal pair anastomosing, forming a costal aerole, costa aerole 0.4 × 0.1 cm; sori in ultimate lobes, linear, along the margins, indusium thick, hyaline; sporangium globose, golden-brown, 130-150 μm; spore tetrahedral, brown, tuberculated, 54-58 μm.

Exsiccatae : West Bengal, Darjiling hills, Singla, 20/04/12, *Nayan Thapa & Dorjay Lama*, 118A (SJCBH), 118B (LBH), N27°06'45.8'' EO88°16'31''; Alt 335±14

Pteris biaurita Linnaeus subsp. ***walkeriana*** Fraser-Jenk. & Dominic Rajkumar; Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 115.200; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:318.2015.

Plants terrestrial, erect; rhizome short, erect, scaly; scales bicolorous, dark brown at centre, margins pale, lanceolate, 0.4-0.6 × 0.1-0.2 cm; fronds bipinnate, 50-90 × 10-40 cm; stipe 15-25 cm, stramineous, glabrous; lamina ovate-lanceolate, sub-coriaceous, 20-65 × 10-40 cm; pinnae 5-12 pairs, opposite, basal pinnae forked, lanceolate, sessile, apex acuminate, 5-20 × 2-4 cm, upper pinnae gradually reducing; pinnae lobed, lobes or segments 14-20 pairs, oblong, obtuse; veins prominent, distinct, 16-20 pairs, basal

pair anastomosing, forming a costal aerole, costal aerole 0.4 × 0.3 cm; sori in ultimate lobes, linear, along the margins, indusium thick, hyaline; sporangium globose, golden-brown, 330-350 μm; spore tetrahedral, brown, tuberculated, 54-58 μm. Exsiccatae : West Bengal, Darjiling hills, Singla, 20/04/12, *Nayan Thapa & Dorjay Lama*, 119A(SJCBH), 119B (LBH), N27°06'45.8'' E088°16'31''; Alt 335±14

Global Distribution: Bangladesh, Bhutan, China, India, Indonesia, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Thailand.

Local Distribution: Singla, Teesta, sukuna, Samsing.

Pteris wallichiana Agardh, Recens. Spec. Pter. 69. 1839; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 115, 1965; Dixit, A census of Indian Pteridophytes, 76, 1984; Thapa, Pteridophytes of Nepal, 31, 2002; Ghosh, The Pter. Flo. Of East. Ind., I, 357, 2004; Singh & Panigrahi, Ferns and fern allies of Arunachal Pradesh, Vol I, 608, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 574, 2008.

Campteria wallichiana Moore, Ind. Fil., 221, 1861.

Plants lithophytic, terrestrial; rhizome erect, thick, 1-2 cm in diam., scaly; scales ovate-lanceolate, entire, acute, brown, 0.4-0.8 × 0.1-0.2 cm; fronds pedate, tufted, umbrella like, 120-150 × 50-80 cm; stipe 40-70 cm, glabrous, lustrous, dark brown; lamina pentagonal, 80-95 × 60-70 cm, 3-partite, middle branch longest; pinnae 15-25 pairs, lobed up to the costa, lanceolate, 25-30 × 3-5 cm; pinnules, 20-27 pairs, alternate, oblong, crenate, acute, 1.5-2 × 0.4-6 cm; veins distinct, once or twice forked, basal pair fused, costal areole present; sori linear, marginal, indusiate; sporangium brown, globose, 320-335 μm; spore tetrahedral, trilete, brown, tuberculate, 46-54 μm. Exsiccatae: West Bengal, Darjiling hills, Third mile, 22/09/11, *Nayan Thapa*, 060A(SJCBH), 060B (LBH), N27°00'31.05'' and E088°17'37.4'', Alt: 2154m±15.

Global distribution: Bhutan, China, India, Indonesia, Japan, Laos, Malaysia, Nepal, Philippines, Thailand, Vietnam

Local distribution: Third mile, lebung, Siingamari.

Pteris cretica Linnaeus, Mant. Pl. 1: 130. 1767; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 113, 1965; Dixit, A census of Indian Pteridophytes, 69, 1984; Thapa, Pteridophytes of Nepal, 73, 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh, Vol II, 572, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 572, 2008.

Pteris nervosa Thunberg, fl. Jap.: 332 (1784); Ching & S.W. Wu in C.Y. Wu, Fl. Xizangica **1**: 68 (1983).

Plants lithophytic, terrestrial, erect; rhizome short, creeping, scaly; scales 0.3-0.5 × c.m, oblong-lanceolate, entire, acuminate, dark brown; Fronds dimorphic, fertile segments narrower than sterile one's, coriaceous, 60-80 × 15-25 cm; stipe 20-60 cm, stramineous, glabrous; lamina deltate, 30-40 × 15-25 cm; pinnae 4-6 pairs, linear, margin entire to toothed, 7.5-12.5 × 2-3 cm, basal pair bifid; veins distinct, forked, parallel; sori linear, marginal, false indusial, brown; sporangium globose, golden brown, 310-315 μm; spore tetrahedral, brown, warty, 44-46 μm.

Exsiccatae: West Bengal, Darjiling hills, Gorkhey, 08/08/11, *Nayan Thapa*, 046A (SJCBH), 046B (LBH), N27°11.40.223 and E088°03.729, Alt: 2463m±3.

Global distribution: Bhutan, Cambodia, China, India, Japan, Laos, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local Distribution: Gorkhey, Ramam

Pteris vittata Linnaeus, Sp. Pl. 2: 1074. 1753; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 112, 1965; Dixit, A census of Indian Pteridophytes, 73, 1984; Thapa, Pteridophytes of Nepal, 76, 2002; Ghosh, The Pter. Flo. Of East. Ind., I, 319, 2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh, Vol II, 605, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 574, 2008.

Pteris longifolia sensu D. Don, Prodr. Fl. Nepal.: 15 (1825).

Pteris vittata L. forma *brevipinna* S. Verma in Mehra, Res. Bull. Punjab Univ. n.s. **12** (1-2): (1961), *nom.nud.*

Plants lithophytic,terrestrial,erect;rhizome short,erect,scaly;scales lanceolate, pale,entire,acuminate,0.8-1 × 0.2-0.4 cm; frond tufted, pinnate, 50-100 × 18-30 cm; stipe 10-20 cm, stramineous, scaly; lamina 40-80 × 18-30 cm, lanceolate, widest at middle, tapering at both ends; pinnae 10-20 pairs, opposite, linear, broadest at base, tapering towards apex, 8-15 × 1-2.5 cm, few basal pair reduced, broad, ovate-lanceolate, 1-3 × 1-2 c.m; veins forked, distinct; sori linear, marginal, indusium entire; sporangium globose, brown, 130-135 μm; spore tetrahedral, hyaline, tuberculated, 48-50 μm.

Exsiccatae: West Bengal, Darjilinghills, Teesta, 23/05/13, *NayanThapa, 124A (SJCBH), 124B (LBH)*, N27°04'40.05'' and E088°25'18.26'', Alt: 366m±9.

Global distribution: Bangladesh, Bhutan, China, India, Nepal.

Local Distribution: Teesta, Singla, Samsing, Sukuna.

Pteris venusta Kunze, Bot. Zeitung (Berlin). 6: 195. 1848; Dixit, A census of Indian Pteridophytes, 73, 1984; Ghosh, The Pter. Flo. Of East. Ind., I, 323, 2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 576, 2008.

Pteris pellucida sensu Bedd. Ferns. South Ind. t. 38, 1863.

Plants lithophytic, terrestrial, erect; rhizome short, erect; fronds dimorphic, simple. 20-30 × 3-4 cm; stipe 4-6 cm, glabrous; sterile lamina oblong-lanceolate, undulate, crenate, acuminate, 20-30 × 3-4 cm; fertile lamina 20-25 × 1.5-3 cm, narrow, elliptic, acuminate, acuation serrated; veins distinct, prominent, once forked; sori marginal, elongated, linear, indusium entire; sporangium globose, brown, 120-130 μm; spore tetrahedral, brown, tuberculated, 45-47 μm.

Exsiccatae: West Bengal, Darjilinghills, Teesta, 23/05/13, *NayanThapa, 132A (SJCBH), 132B (LBH)*, N27°04'40.05'' and E088°25'18.26'', Alt: 366m±9.

Global Distribution: Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, N Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Teesta, Singla, Kalijhora.

Pteris semipinnata Linnaeus, Sp. Pl. 2: 1076. 1753; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 113, 1965; Dixit, A census of Indian Pteridophytes, 72, 1984; Thapa, Pteridophytes of Nepal, 75, 2002; Ghosh, The Pter. Flo. Of East. Ind., I, 342, 2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh, Vol II, 591, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 575, 2008.

Plants lithophytic, terrestrial, erect; rhizome short, creeping, scaly; scales 0.6-0.8 × 0.1-0.2 cm, lanceolate, acuminate, bicoloured, central dark portion with pale margins; frond monomorphic, tufted, 40-60 × 15-24 cm; lamina lanceolate, 30-40 × 15-24 cm; stipe castaneous, glabrous, 10-20 cm; pinnae 4-8 pairs opposite, 12-18 × 5-8 cm, widest at base, sessile, acroscopic margin entire, basiscopic margin deeply lobed, basal basiscopic pinnae largest, sterile margin serrate, fertile margin entire; veins distinct, prominent, forked; sori linear, marginal, indurated; sporangium globose, brown, 120-125 μm; spore tetrahedral, brown, tuberculate, 44-48 μm.

Exsiccatae: West Bengal, Darjiling hills, Teesta, 02/02/12, *Nayan Thapa, 106A (SJCBH), 106B (LBH)*, N27°04'40.05'' and E088°25'18.26'', Alt: 366m ± 9.

Global distribution: Bhutan, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local Distribution: Teesta, Singla.

Pteris longipes D. Don, Prodr. Fl. Nepal. 15. 1825; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 114, 1965; Dixit, A census of Indian Pteridophytes, 70, 1984; Thapa, Pteridophytes of Nepal, 74, 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 573, 2008.

Plants lithophytic, terrestrial, erect; rhizome short, 1.5-2 cm in diam., scaly; scales, lanceolate, brown, entire, 0.4-0.6 × 0.1-0.2 cm; Fronds monomorphic, tripartite, clustered, 60-100 × 20-50 cm; stipe 20-40 cm, castaneous, scaly at base, glabrous above; lamina herbaceous, dull green, 40-60 × 20-40 cm; pinnae three, one terminal, two lateral opposite pinnae, lanceolate, 30-50 × 10-20 cm; pinnules 14-20 pairs, opposite, lanceolate, apex acuminate, 8-10 × 2-4 cm; segment numerous, 10-25 pairs, linear-oblong, margins toothed, apex mucronate; veins distinct, prominent,

simple; sori linear, marginal, induistae; sporangium globose, brown, 320-330 μm ; spores tetrahedral, brown, tuberculate, 45-48 μm .

Exsiccatae: West Bengal, Darjilinghills, Teesta, 02/02/12, *NayanThapa, 105A* (*SJCBH*), *105B* (*LBH*), N27°04'40.05'' and E088°25'18.26'', Alt: 366m \pm 9.

Global distribution: Bhutan, China, India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local Distribution: Teesta, Lopchu, Makaibari, rohini

Pteris scabririgens Fraser-Jenkins, Verm & T. G. Walker, Taxon. Revis. Indian Subcontinental Pteridophytes. 111. 2008.

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales brown, oblong, acuminate, 0.4-0.8 \times 0.2-0.4 cm; fronds monomorphic, pinnate, coriaceous, rigid, 30-60 \times 10-20 cm; stipe 10-20 cm, hard, rough, stramineous; lamina lanceolate, dull green, coriaceous, 20-40 \times 10-20 cm; pinnae 8-10 pairs, alternate, basal pair largest, bipartite on basisopic side, upper pinnae lanceolate, simple, 8-10 \times 3-4 cm; pinules deeply lobed, opposite, 25-30 pairs, lanceolate, entire, acute; veins distinct, prominent, forked; sori linear, marginal, induistae; sporangium round, golden brown, 320-370 μm ; spore tetrahedral, pale-brown, tuberculate, 40-43 μm .

Exsiccatae: West Bengal, Darjilinghills, Lebong, 18/07/11, *NayanThapa, 036A* (*SJCBH*), *036B* (*LBH*), N27°04'13.05'' and E088°216'59.7'', Alt: 1659m \pm 9.

Global distribution: Bhutan, China, India, Nepal.

Local Distribution: Lebong, singamari, lava

Pteris spinescens Presl, Rel. Haenk. 1:56, 1825; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 575, 2008.

Pteris setuloso-costulata Hayata, Icon. Pl. Formosa. 4:241. f. 168, 1914.

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales lanceolate, margin toothed, acuminate, brown, 0.8-1 \times 0.2-0.4 cm; fronds monomorphic, pinnate, 40-120 \times 30-45 cm; stipe smooth, shining, ebeneous, 10-30 cm; lamina 30-80 \times 30-45 cm, ovate-lanceolate; pinnae 4-9 pairs, alternate, basal pair deltate, forked 2-3

times basiscopically, upper pinnae pair lanceolate, deeply lobed, acuminate, 14-20 × 3.5-4 cm, costa and costule spinose; basal basiscopic pinnule lanceolate, acuminate, 6 × 3 cm; lobes 15-20 pairs, oblong, margin entire, apex round, 1.7-2.2 × 0.5-0.8 cm; sori marginal, linear, indusiate; sporangium globose, golden-brown, 320-330 μm; spore tetrahedral, dark brown, tuberculate, 48-50 μm.

Exsiccatae: West Bengal, Darjilinghills, Teesta, 15/07/11, *Nayan Thapa*, 022A (*SJCBH*), 022B (*LBH*), N27°04'40.05'' and E088°25'18.4'', Alt: 649m ± 15.

Global distribution: Bhutan, India, Nepal, Myanmar, Japan, Taiwan.

Local Distribution: third mile, lebung, lava, chimney

Pteris aspericaulis Wallich ex J. Agardh, Recens. Spec. Pter. 22. 1839; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas, 113, 1965; Dixit, A census of Indian Pteridophytes, 68, 1984; Thapa, Pteridophytes of Nepal, 72, 2002; Ghosh, The Pter. Flo. Of East. Ind., I, 348, 2004; Singh & Panigrahi, Ferns and fern allies of Arunachal Pradesh, Vol II, 565, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 571, 2008.

Pteris quadriaurita Retz. var *aspericaulis* (Wallich ex J. Agardh) Bedd., Handb. Ferns Brit. India: 111 (1883).

Pteris pseudoquadriaurita Khullar, An Illust. Fern Fl. W. Himal. 1: 285 (1994).

Plants lithophytic, terrestrial, erect; rhizome sub-erect, short, scaly; scales lanceolate, entire, brown, acuminate, 0.2-0.6 × 0.1-0.2 cm; fronds monomorphic, pinnate, sub-coriaceous, 40-110 × 12-24 cm; stipe rough, pinkish, stramineous in maturity, 10-40 cm; lamina lanceolate, dull green, 30-70 × 12-24 cm; pinnae 8-16 pairs, alternate, linear-lanceolate, acuminate, basal pair largest, bipartite, 6-12 × 3-5.5 cm; pinnules oblong, opposite, 10-20 pairs, entire, apiculate, 3-5.5 × 0.5-1 cm; seta at junction of costa and costules; veins distinct, prominent, free, forked; sori marginal, linear, indusiate; sporangium globose, brown, 330-375 μm; spore tetrahedral, brown, tuberculate, 42-45 μm.

Exsiccatae: West Bengal, Darjilinghills, Sukhia, 23/09/11, *Nayan Thapa*, 063A (*SJCBH*), 063B (*LBH*), N26°59'49.05'' and E088°09'50.4'', Alt: 2314m ± 15.

Global Distribution: Bhutan, China, India, Nepal, Thailand.

Local Distribution: Sukhia, singamari, lebung.

Pteris puberula Ching, Bull. Fan Mem. Inst. Biol., Bot. 11: 52. 1941; Thapa, Pteridophytes of Nepal, 74, 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 575, 2008.

Pteris nepalensis H. Ito in Hara, Fl. East. Himal., 446, t. 26, 1966.

Plants lithophytic, terrestrial, erect; rhizome short, sub-erect, scaly; scales lanceolate, acuminate, entire, brown, 0.4-0.8 × 0.2-0.4 cm; fronds monomorphic, pinnate, sub-coriaceous, 30-80 × 15-30 cm; stipe smooth, lustrous, castaneus, 5-15 cm; pinnae sub-opposite, 3-5 pairs, lanceolate, acuminate, basal pair largest, forked basiscopically, 10-15 × 3-5 cm; pinnules opposite, 10-20 pairs, lanceolate, entire, acute, 1.5-2.5 × 0.8-1.3 cm; veins distinct, prominent, forked; sori marginal, linear, induristae; sporangium globose, brown, 320-390 μm; spore tetrahedral, brown, tuberculate, 40-45 μm.

Exsiccatae: West Bengal, Darjilinghills, Sukhia, 23/09/11, Nayan Thapa, 062A (SJCBH), 062B (LBH), N26°59'49.05'' and E088°09'50.4'', Alt: 2314m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Sukhia, gorkhey, Damsong.

Pteris medogensis Ching & S.K. Wu, Fl. Xizang. 1: 71-72, pl. 16, f. 1-4 1983; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 573, 2008.

Plants lithophytic, terrestrial, erect; rhizome short, cylindrical, scaly; scales ovate-lanceolate, acute, entire, brown, 0.2-0.6 × 0.1-0.2 cm; fronds monomorphic, pinnate, sub-coriaceous, 30-100 × 15-30 cm; stipe smooth, stramineous, 10-30 cm; pinnae alternate, 8-12 pairs, lanceolate, acuminate, basal pair largest, forked basiscopically, 8-15 × 2-4 cm; pinnules opposite, 10-20 pairs, oblong, entire, obtuse, 1.5-2 × 0.8-1 cm; Seta prominent in costa and costules; veins distinct, prominent, forked; sori marginal, linear, induristae; sporangium globose, brown, 300-330 μm; spore tetrahedral, brown, tuberculate, 48-54 μm.

Exsiccatae: West Bengal, Darjilinghills, Chatakpur, 1/10/11, Nayan Thapa, 068A (SJCBH), 068B (LBH), N26°00'43.2'' and E088°17'30.2'', Alt: 2253m ± 15.2.

Global distribution: Bhutan, India.

Local distribution: Chatakpur, Damsong, Chimney

Pteris ensiformis N. L. Burman, Fl. Indica. 230. 1768.

(Figure 3.17: A to D)

Plants lithophytic, terrestrial, erect; rhizome ascending, scaly; scale lanceolate, entire, acuminate, brown, 0.4×0.1 cm; fronds dimorphic, sterile frond pinnate, 10-25× 5-10 cm; stipe stramineous, 5-10 cm; pinnae 3 pairs, stalked, alternate, linear, acuminate, 2.5-5× 0.5-0.6 cm, basal pinnae bi-partite; pinnule 2 pairs, opposite, elliptic, serrate, acute, 3.5× 1 cm; fertile fronds pinnate, 10-50× 10-20 cm; pinnae 3 pairs, alternate, linear, acute to acuminate, 5-10× 0.8-1.2 cm, basal pinnae bi-partite; pinnule 2 pair, stalked elliptic, entire, apex rounded, 2-4× 0.7-1.2 cm; veins distinct, forked; sori linear, along margin, indusiate, brown; sporangium globose, dark brown, 370-400µm; spore tetrahedral, tuberculated, brown, 50-53µm.

Exsiccatae: West Bengal, Darjilinghills, Sukhia, 23/09/11, *NayanThapa, 062A (SJCBH), 062B (LBH)*, N26°59'49.05'' and E088°09'50.4'', Alt: 2314m±15.

Global distribution: Bhutan, Cambodia, India, Japan, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

Local distribution: Sukhai, Mungpoo

Pteris medogensis Ching & Wu, Fl. Xizangica 1: 71-72, pl. 16, f. 1-4 71 1983.

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales lanceolate, margin toothed, acuminate, brown, 1 × 0.3 cm; fronds monomorphic, pinnate, 30-130 × 30-45 cm; stipe smooth, stramineous, 10-30 cm; lamina 20-100 × 30-45 cm, ovate-lanceolate; pinnae 10-14 pairs, alternate, basal pair deltate, forked basiscopically once, upper pinnae pair lanceolate, lobed, acuminate, 14-20 × 3.5-4 cm, costa and costule spinose; basal basiscopic pinnule lanceolate, 6× 3 cm; lobes 15-20 pairs, oblong, margin entire, apex round, 1.7-2.2× 0.5- 0.8 cm; sori marginal, linear, indusiate; sporangium globose, golden-brown, 350-360µm; spore tetrahedral, dark brown, tuberculate, 48-50µm.

Exsiccatae: West Bengal, Darjilinghills, Teesta, 11/10/11, *NayanThapa, 068A (SJCBH), 068B (LBH)*, N27°00'20.05'' and E088°17'33.4'', Alt: 1800m±15.

Global distribution: Bhutan, India.

Local distribution: Mungpoo, Teesta

Vittariaceae Ching, Sunyatsenia 5(4): 210, 232. 1940.

Vittaria J.E.Smith in Mem.Acad.Turin5:413.pl.9.f.5.1793.

1. Fronds more than 20 cm in length.....2
- + Fronds less than 20 cm in length.....3
2. Scales blackish-brown,0.6-0.8× 0.1-0.2 cm in length..... *Vittaria elongata*
- + Scales dark-brown, 0.2-1× 0.1-0.3 cm in length..... *Vittaria flexuosa*
3. Scales dark brown,linear,0.4-0.9 × 0.1-0.2cm in length..... *Vittaria sikkimensis* .
- + Scales light brown,lanceolate, 0.2-0.6 × 0.1-0.3cm in length... *Vittaria taeniophylla*

Vittaria elongata Swartz, Syn. Fil. 109, 302 .1806; Mehra & Bir, Pteridohytic Fl. Of Darjeeling and Sikkim Himalayas.106.1965; Dixit , A Cen. of Indian Pterid. 81 .1984; Thapa, Pterid. of Nepal 78.2002; Ghosh,The Pterid.. Flo. Of East.Ind.I: 301.2004; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh II : 791 . 2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid.. With a rev. Cen. List 580.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:378 .2015

Pteris graminifolia Roxb. in Griff., Calc. J. Nat. Hist. 4: 502, t.33 (1844).

Vittaria elongata var. *angustifolia sensu* Panigrahi, Bull. Bot. Surv. India 2: 314 (1961), *non* Holttum (1954).

Plants epiphytic,pendulous;rhizome creeping,scaly;scales blackish-brown, lanceolate, margin toothed,acuminate,0.6-0.8× 0.1-0.2cm;lamina simple,tufted,50-90× 0.3-0.6 cm,linear,entire,attenuated,green;stipe 1-7cm,glabrous;sori marginal, linear,elongated,within shallow grooves;sporangium globose,brown,290-300 µm;spore bilateral,reniform,pale-green,50-64µm.

Exsiccatae:WestBengal,Darjilinghills,sukuna,19/07/11,*NayanThapa,035A (SJCBH),035B (LBH),N26°48'03.5''* and *E088°22'09.7''*,Alt: 265m±15

Global distribution: Bhutan, China, India, Philippines, Malaysia, Vietnam.

Local distribution: Sukuna, Singla, Samsing.

Vittaria flexuosa Fée, Mem. Fan Foug.: 16 .1852; Mehra & Bir, Pteridohytic Fl. Of Darjeeling and Sikkim Himalayas 107.1965; Dixit , A Cen. of Indian Pterid. 82 .1984; Thapa, Pterid. of Nepal 78.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 306.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 580.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 379 .2015

Vittaria lineata sensu Bedd., Handb. Ferns Brit. India: 406 (1883)

Vittaria himalayensis sensu Itô: 500 (1966), *p.p.*, *non* Ching.

Plants epiphytic, pendulous; rhizome short, creeping, scaly; scales linear, entire, acuminate, dark-brown, 0.2-1 × 0.1-0.3 cm; lamina simple, tufted, 20-40 × 0.2-0.4 cm, linear, entire, attenuated, green; stipe 1-4 cm, glabrous; sori sub-marginal, linear, elongated, within shallow furrows, indusiate; sporangium globose, brown, 250-310 µm; spore reniform, smooth, pale, 55-57 × 30-37 µm.

Exsiccatae: West Bengal, Darjilinghills, Gayribas, 20/07/11, *Nayan Thapa, 040A (SJCBH), 040B (LBH)*, N27°03'20.5'' and E088°01'23.4'', Alt: 2656m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Gayribas, Senchel, Lava.

Vittaria sikkimensis Kuhn, Linnaea **36**: 66 (1869); Mehra & Bir, Pteridohytic Fl. Of Darjeeling and Sikkim Himalayas 106.1965; Dixit , A Cen. of Indian Pterid. 82 .1984; Thapa, Pterid. of Nepal 79.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 303. 2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 581.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 384 .2015

Vittaria minor Bedd., Ferns Brit. India: t.58 (1865), *non* Fée (1852).

Plant epiphytic, pendent; rhizome short, creeping, scaly; scales linear-linear, entire, acuminate, dark brown, 0.4-0.8 × 0.1-0.2 cm; lamina simple, clustered on rhizome, attenuated, entire, acute, costa raised adaxially, 5-15 × 0.2-0.63 cm; stipe small, glabrous, 0.3-0.4 cm; sori superficial, sub-marginal, linear, indusiate; sporangium globose, brown, 310-320 μm; spore reniform, bilateral, greenish, 32-37 μm.

Exsiccatae : West Bengal, Darjiling hills, Mungpoo, 26/10/11 *Nayan Thapa & Dorjay Lama*, 091A (SJCBH), 091B (LBH), N27°00'32.4'' and E088°16'37.5'', Alt: 1545m±9.

Global distribution: Bhutan, Nepal, India.

Local distribution: Mungpoo, Rungdung

Vittaria taeniophylla Copeland, Philip. J. Sci. 1 Suppl. II: 157 (1906); Dixit, A Cen. of Indian Pterid. 82 .1984; Thapa, Pterid. of Nepal 79.2002; Ghosh, The Pterid.. Flo. Of East. Ind. I: 308.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 581.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 385 .2015

Vittaria revoluta Don, Prodr. Fl. Nepal.: 15 (1825).

(Plate 3.8:G)

Plant epiphytic, pendent; rhizome short, creeping, scaly; scales lanceolate, entire, acute, brown, 0.4-0.6 × 0.1-0.3 cm; lamina simple, clustered on rhizome, attenuated, entire, acute, costa raised adaxially, 5-15 × 0.4-0.6 cm; stipe small, glabrous, 0.3-0.6 cm; sori superficial, sub-marginal, linear, indusiate; sporangium globose, brown, 260-270 μm; spore reniform, bilateral, pale, 45-55 μm.

Global distribution: Bhutan, China, India, Nepal, Philippines.

Local distribution: Kayakatta, gayribas, Alubari

Exsiccatae: West Bengal, Darjiling hills, kayakatta, 11/09/11, *Nayan Thapa*, 056A (SJCBH), 056B (LBH), N27°03'34.5'' and E088°01'28.4'', Alt: 2818m±15.

Aspleniaceae Newman, Hist. Brit. Ferns 6. 1840.

Asplenium Linnaeus, Sp. Pl. 2: 1078. 1753

1. Fronds simple.....2
- + Fronds Pinnate to pinatipartite.....3
2. Lamina 14-33 × 1-3 cm.....*Asplenium ensiforme*
- + Lamina 20-60 × 4-6 cm.....*Asplenium phyllitidis*
3. Costa with scales.....*Asplenium magnificum*
- + Costa without Scales.....4
4. Stipe length more than 6 cm.....5
- + Stipe length less than 6cm.....*Asplenium lacinatum*
5. Pinnae 10-12 pairs.....*Asplenium amoenum*
- + Pinnae 16-40 pairs..... 6
6. Perennating bud presnt on rachis.....*Asplenium yoshinagae* subsp *indicum*
- + Perennating bud absent on rachis..... *Asplenium cheilosorum*

Asplenium cheilosorum Kunze ex Mett.,Abh.Senck.Naturf.Ges.3:177,t.5,f.12-13.1859; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 157.1965; Dixit , A Cen. of Indian Pterid.116.1984; Thapa, Pterid. of Nepal 85.2002; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh I:95.2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 583.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:159.2015.

Asplenium heterocarpum Wallich ex Hooker,Sp.Fil.3:132,t.175.1860.

Plant lithophytic, pendent; rhizome thin, long ,creeping, scaly; scales lanceolate, entire, acuminate,brown,0.4-0.6× 0.1-0.2 cm; fronds uni-pinnate, membranaceous, green ,30-45× 4-6 cm; stipe chesnut coloured,shining,6-10 cm; lamina linear-lanceolate,25-35× 4-6 cm; pinnae alternate, 20-40 pairs, stalked, dimidiate,upper

margin deeply lobed, lower margin entire, 2-3 × 0.8-1.2 cm; veins distinct, forked; sori oblong, elongated, confined to lobes, indusiate, brown; sporangium globose, dark brown, 370-380µm; spore reniform, perisporate, brown, 50-54µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, *Nayan Thapa & Dorjay Lama*, 145A(SJCBH), 145B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: Bhutan, China, India, Nepal, Japan, Taiwan.

Local distribution: Mangwa, Takdah.

Asplenium ensiforme Wallich ex Hooker & Greville, Ic. Fil. 1: t. 71 (1828); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 156, 1965; Dixit, A Cen. of Indian Pterid. 117, 1984; Thapa, Pterid. of Nepal, 85, 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 98, 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 584, 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159, 2015.

Plants epiphytic, pendent; rhizome erect, scaly; scales black, ovate-lanceolate, entire, acuminate, 0.8-1 × 0.1-0.3 cm; frond simple, oblanceolate, 15-35 × 1-3 cm; stipe small, winged, 1-2 cm; lamina lanceolate, coriaceous, entire, attenuated at both ends, 14-33 × 1-3 cm; veins forked, obscure; sori linear, oblique, 0.5-1 cm, indusium toothed, brown; sporangium globose, golden-brown, 150-160µm; spore reniform, perispore folded, brown, 45-53µm.

Exsiccatae : West Bengal, Darjiling hills, Lamadhura, 04/08/11, *Nayan Thapa & Dorjay Lama*, 043A(SJCBH), 043B (LBH), N27°00'23.4'' and E088°05'30.5'', Alt: 2803m±21.1.

Global Distribution: Bhutan, China, India, Nepal, Myanmar, Thailand, Taiwan.

Local Distribution: Lamadhura, Third mile, Singamari, Lava, Chimney.

Asplenium laciniatum Don, Prod. Fl. Nepal, 8, 1825; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 157, 1965; Dixit, A Cen. of Indian Pterid. 119. 1984; Thapa, Pterid. of Nepal 86.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 585.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159.2015.

Asplenium varians Wallich ex Hooker & Greville, Ic. Fil.: t. 172, 1829.

Plants lithophyte on rocks, pendent; rhizome short, erect, scaly; scales lanceolate, entire, acuminate, 0.6-0.8 × 0.2-0.4 cm; fronds bipinnate, herbaceous, green; stipe stramineous, scaly, 2-5 cm; lamina bipinnate, linear-lanceolate, attenuated, apex acuminate, 10-23 × 3-5 cm; pinnae alternate, 10-20 pairs, stalked, rhomboid, 1.5-3 × 1.2-2 cm; ultimate segment oblong-elliptic, stalked fan shaped, lobed, acute, 1.5 × 1.2 cm; veins distinct, forked; sori linear, indurated, entire; sporangium brown, globose, 140-150 μm; spore reniform, brown, minutely spinose, 43-47 μm.

Exsiccatae : West Bengal, Darjiling hills, Kuresong, 13/12/11, *Nayan Thapa & Dorjay Lama*, 103A (SJCBH), 103B (LBH), N26°53'03.4'' and E088°17'1.1'', Alt: 1498m ± 10.1.

Global Distribution: Bhutan, China, India, Nepal, Taiwan.

Local Distribution: Kuresong, Third mile, Damsong

Asplenium normale Don, Prodr. Fl. Nepal.: 7 (1825); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 156, 1965; Dixit, A Cen. of Indian Pterid. 120. 1984; Thapa, Pterid. of Nepal 87.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 114.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 586.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159.2015.

Plants lithophytic on rocks, pendent; rhizome erect, densely scaly; scales lanceolate, entire, acuminate, blackish-brown, 0.4-0.8 × 0.2-0.3 cm; Fronds unipinnate, tufted, 10-40 × 2-4 cm; stipe 6-8 cm, castaneous, grooved on dorsal surface, glabrous,

scaly at base; lamina linear-lanceolate, subcoriaceous, greenish, 8-32 × 2.5-4 cm; pinnae 20-30 pairs, alternate, 1.5-2 × 0.4-0.7 cm, sessile, rectangular, margin crenate, obtuse, acroscopic side auricled; rachis with buds; sori oblique, median, 0.2-0.3 cm, indusium elliptic, brown; sporangium globose, brown, 147-157 μm, spore reniform, perispore broad, brown, 43-47 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 09/07/11, *Nayan Thapa & Dorjay Lama*, 014A(SJCBH), 014B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m±15.

Global Distribution: Bhutan, China, India, Nepal, Malaya, Hong kong, Taiwan.

Local Distribution: Mungpoo road, Damsong

Asplenium phyllitidis Don, Prodr. Fl. Nepal.: 7(1825); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 114, 1965; Dixit, A Cen. of Indian Pterid. 69. 1984; Thapa, Pterid. of Nepal. 73, 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II: 569. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 572. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 159. 2015.

Thamnopteris nidus (Linnaeus) Presl var *phyllitidis* (Don) Bedd., Handb. Ferns Brit. India: 139(1883).

(Figure 3.16: A to D)

Plants epiphytic to lithophytic, erect; rhizome short, erect, scaly; scales ovate-lanceolate, laciniated, acuminate, brown, 0.6-1.2 × 0.3-0.5 cm; fronds simple, tufted, forming nest, 20-60 × 4-6 cm; stipe woody, stout, 1-4 cm; lamina linear-lanceolate, glabrous, entire, attenuated, caudate, cartilaginous; veins prominent, visible, forked; sori linear, oblique, indusia entire, membranous; sporangium globose, brown, 145-153 μm, spore reniform, spinulose, brown, 47-53 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 04/05/11, *Nayan Thapa & Dorjay Lama*, 008A(SJCBH), 008B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m±15.

Global distribution: Bhutan, China, India, Japan, Nepal, Vietnam.

Local distribution: Rungdung, Third mile.

Asplenium magnificum (Ching) Bir, Fraser-Jenkins & Lovis, Fern Gaz. 13: 61. 1985; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 586.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:445.2015.

Ceterachopsis magnifica Ching, Bull. Fan Mem. Inst. Biol., Bot. 11: 56. 1941.

Plants lithophytic, attached on rocks in streams; rhizome erect, short, scaly; scales ovate, entire, acute, brown, $0.2-0.6 \times 0.1-0.4$ cm; fronds pinnatifid, herbaceous, $10-20 \times 3-4$ cm; stipe brown, 2-3 cm, brown, scaly; lamina elliptic, attenuated, obtuse, $8-16 \times 3-4$ cm; segments alternate, 8-12 pairs, oblong, hyaline, sinuate, basal pair smallest, 0.5×0.5 cm; upper one's 2×1.3 cm; veins obscure; sori 3-4 pairs/segment, linear to elliptic, 0.3-0.6 cm, indusium elliptic, brown; sporangium globose, brown, 163-173 μm ; spore reniform, reticulate, brown, 47-53 μm .

Exsiccatae : West Bengal, Darjiling hills, meghma, 11/07/13, *Nayan Thapa & Dorjay Lama*, 161A(SJCBH), 161B (LBH), N27°01'55.4'' and E088°04'44.5'', Alt: 2674m \pm 11.3

Global distribution: China, India, Nepal.

Local distribution: Meghma, Gorkhey.

Asplenium yoshinagae Makino subsp. **indicum** (Sledge) Fraser-Jenkins, Pak. Sys. 5:85-120.1992; Thapa, Pterid. of Nepal 89.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 589. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:159.2015.

Asplenium planicaule Wallich ex Mett., Asplen. Tonkin: 157, 1859.

Asplenium indicum Sledge, Bull. Brit. Mus. Nat. Hist. 3:264, 1965.

Plants epiphytic, pendent; rhizome erect, scaly; scale lanceolate, entire, acuminate, dark-brown, $0.4-0.8 \times 0.2-0.3$ cm; frond uni-pinnate, coriaceous, $20-50 \times 4-6$ cm; stipe 10-20 cm, stramineous, scaly; lamina lanceolate, apex acute, $15-30 \times 4-6$ cm; pinnae alternate, 16-20 pairs, stalked, asymmetrical, ovate, lobed, auricled on acroscopic side, cuneate, acute, $2-3 \times 0.8-1.4$ cm; veins distinct, forked; sori linear, indusiate; sporangium globose, brown, 140-150 μm ; spore reniform, smooth, brown, 40-45 μm .

Exsiccatae : West Bengal,Darjiling hills,Chatakpur,01/10/11, *Nayan Thapa & Dorjay Lama*, 067A(SJCBH), 067B (LBH),N27°00'28.4''and E088°17'37.25'', Alt: 2174m±15.2.

Global distribution: Bhutan,China,India, Japan, Vietnam.

Local Distribution: Chatakpur,Third mile,Singamari,Lava.

Asplenium amoenum Presl ex Mett., *Uber Einige Farngattungen* VI:175.1859; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 582.2008;Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:19.2015.

Hymenasplenium obliquissimum (Hayata) Sugimoto, Keys Herb Pl. Jap. Pterid. 356-406, 1966.

Plants epiphytic,pendent;rhizome long, creeping,scaly,scales ovate,entire, acute, brown; fronds uni-pinnate,distant on rhizome, 10-25 × 3-4 cm;stipe 4-7 cm, castaneous,glabrous;lamina green,lanceolate,6-18× 3-4 cm,glabrous;pinnae staked, alternate,10-12 pairs,base asymmetrical,acroscopic side truncate, ,basispic side straight,acroscopic margin crenate,apex acute,1.4-1.8× 0.4-0.6 cm;veins prominent,forked;sori linear,indusiate,entire;sporangium globose, brown,134-144µm;spore reniform,smooth,pale-brown,35-43 µm.

Exsiccatae : West Bengal,Darjiling hills, Third mile,01/10/11, *Nayan Thapa & Dorjay Lama*, 070A(SJCBH), 070B (LBH),N27°00'31.4''and E088°17'37.2'',Alt: 2154m±15.2

Global Distribution:China,India, Indonesia, Japan, Vietnam.

Local Distribution: Third mile,Gorkhey,rechala.

Thelypterideaceae Ching ex Pichi-Sermolli in *Webbia* 24:709.1970

Thelypteris Schmidel, *Icon. Pl.*, ed. Keller. 3, 45. 18 Oct 1763, nom. cons.,

1. Fronds uni-pinnate to bipinnate, 20-180×10-30 cm.....2

+. Fronds tripinnate, 100-250× 40-60 cm.....*Thelypteris ornata*

2. Pinnae deeply lobed with segments3

- + Pinnae dentate or serrate, segment absent.....8
- 3. Basal basiscopic pinnules/segment larger than acroscopic segment.....4
- + Basal basiscopic segment equal to acroscopic segment.....5
- 4. Basiscopic pinnules 2.5-4 × 0.5-0.8cm.....*Thelypteris aurita*
- + Basiscopic pinnules 1 × .5cm.....*Thelypteris pyrrhorhachis*
- 5. Segments entire, Lanceolate.....6
- + Segments lobed, oblong.....*Thelypteris flaccida*
- 6. Pinnae pairs more than 15 cm.....*Thelypteris cana*
- + Pinnae pair less than 15 cm.....7
- 7. Terminal pinnae larger than lateral pinnae, 11 × 2.5 cm.....*Thelypteris ornatipes*
- + Terminal pinnae smaller than lateral pinnae, 5 × 2.7 cm.....*Thelypteris procera*
- 8. Basal pinnae auricled at basiscopic side.....*Thelypteris lakhimpurensis*
- + Basal pinnae without auricle.....9
- 9. Largest pinnae pair, 20-30 × 2-4 cm.....*Thelypteris arida*
- + Largest pinnae pair, 20-40 × 3.5-5 cm.....*Thelypteris nudata*

Thelypteris lakhimpurensis (Rosenst.) Iwatsuki, Mem. Coll. Sci. Univ. Kyoto (Bot.) 3:194 (1965); Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 597.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Pronephrium lakhimpurensis (Rosenst.) Holttum, Blumea 20:110.1972.

Dryopteris lakhimpurensis Rosenst., Med. Rijks Herb. 31:7.1917.

(Figure 3.18: A to C)

Plants lithophytic, terrestrial, erect; rhizome short, creeping, scaly; scales ovate, margin hairy, brown, 0.4-0.6 × 0.1-0.2 cm; fronds pinnate, papery, 80-110 × 30-40 cm; stipe castaneous, 30-45;

lamina oblong-lanceolate, 50-70 × 30-40cm; pinnae opposite, 3-5 pairs, sub-sessile, lanceolate, cuneate, acuminate, crenate, terminal pair largest, 15-20 × 4-7cm, basal pair auricled at basiscopic side; veins distinct, united; sori round, median, indusiate, in two row, between the prominent veinlet; sporangium round, brown, 353-373µm; spore reniform, brown, minutely spinose, 47 × 30µm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa & Dorjay Lama*, 127A(SJCBH), 127B (LBH), N27°04'40.4'' and E088°25'18.2'', Alt: 649m±14.1.

Global distribution: Bangladesh, Bhutan, China, Nepal, India.

Local Distribution: Teesta, Singla, Kalijhora.

Thelypteris arida(Don) Morton, Amer. Fern J. 49:113(1959); Thapa, Pterid. of Nepal 91.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List. 590.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Christella arida(Don) Holttum in Nayar & Kaur, Comp. Bedd. Handb. Ferns Brit. India: 206(1974).

Aspidium aridium Don, Prodr. Fl. Nepal.: 4(1825).

Plants lithophytic, terrestrial, erect; rhizome wide, creeping, scaly; scales ovate-lanceolate, entire, acuminate, brown, 0.4-0.8 × 0.1-0.3cm; fronds pinnate, coriaceous, 100-180 × 20-30 cm; stipe castaneus, 40-90 cm; lamina linear-lanceolate, 60-90 × 30-40 cm, pale green; pinnae sub-opposite, 20-30 pairs, sessile, lanceolate, serrate, acuminate, middle pair largest, 20-30 × 2-4 cm, 2-3 basal pairs gradually reduced, 5-10 × 1-2.5 cm; veins distinct, simple, 10-12 pairs; sori round, median, indusiate; sporangium globose, brown, 267-300µm; spore reniform, perispore folded, brown 51-43µm.

Exsiccatae : West Bengal, Darjiling hills, Singla, 23/07/13, *Nayan Thapa & Dorjay Lama*, 183A(SJCBH), 183B (LBH), N27°06'45.4'' and E088°16'3.1'', Alt: 325m±11.1.

Global Distribution: Bangladesh, Bhutan, China, India, Nepal, Taiwan.

Local Distribution: Singla, Rambi, Teesta, Samsing.

Thelypteris flaccida(Blume)Ching,Bull.Fan Mem.Inst.Biol.(Bot.) 6:336(1936); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 151.1965; Thapa, Pterid. of Nepal 93.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a revi. Cen. List 592.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Metathelypteris flaccida (Bl.)Ching,Acta Phytotax.Sin.8:306(1963)

Aspidium flaccidiun Bl.,Enum.Pl.Jav.:16(1828)

Plants lithophytic, terrestrial, erect; rhizome short, erect, scaly; scales linear-lanceolate, margins hairy, acuminate, 0.5-0.7 × 0.2-0.3 cm; fronds pinnate, tufted, 30-50 × 10-15 cm; stipe 10-20 cm, stramineous; lamina lanceolate, herbaceous, pubescent, 20-30 × 10-15 cm; pinnae subopposite, 8-10 pairs, lanceolate, acuminate, 2nd pair largest, 5-7.5 × 1.5-3 cm, basal pair smaller, deflexed; pinnules opposite, 8-12 pairs, deeply lobed, oblong, obtuse, entire, hairy; veins hidden, forked; sori median, round, indusiate, indusium reniform, brown; sporangium globose, dark brown, 276-303 μm; spore reniform, perispore folded, light brown, 52 × 36 μm.

Exsiccatae : West Bengal, Darjiling hills, Ghoom, 25/07/13, *Nayan Thapa & Dorjay Lama*, 158A (SJCBH), 158B (LBH), N27°00'13.4'' and E088°24'01.2'', Alt: 2501 m ± 11.1.

Global distribution: Bhutan, China, India, Malaya, Sri Lanka.

Local distribution: Lebung, Lopchu, Makaibari.

Thelypteris aurita (Hooker) Ching in Bull.Fan.Mem.Inst.Biol.6:266,1936;); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 152.1965; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 591.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Gymnogramma aurita Hooker, Icon. Pl. 10: t. 974. 1854

Pseudophegopteris aurita (Hooker) Ching, Acta Phytotax. Sin. 8: 314. 1963.

Plants Lithophytic, terrestrial, erect; rhizome creeping, scaly; scales 0.3-0.9× 0.1-0.3 cm, ovate-lanceolate, acuminate, brown; fronds remote, bipinnatifid, coarse, green, 80-120 × 20-40 cm; stipe castenus, shining, 20-40cm; lamina lanceolate, 60-80 × 20-40 cm; pinnae opposite, 15-20 pairs, linear-lanceolate, 2nd last pair longest, 35-40 × 4-6 cm, basal pair 27-33 × 3.5-5 cm; pinnules deeply lobed, opposite, 13-20 pairs, basal baaiscopic largest, 2.5-4 × 0.5-0.8cm, entire, acute; veins distinct, forked; Sori sub-marginal, elongated, exindusiate; sporangium globose, brown, 333-345 μm, spore reniform, pale, 43×23 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 01/10/11, *Nayan Thapa & Dorjay Lama*, 073A(SJCBH), 073B (LBH), N27°00'31.4'' and E088°17'37.2'', Alt: 2154m±15.2

Global Distribution: Bhutan, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Vietnam.

Local Distribution: Third miile, Singamari, Lava.

Thelypteris procera (Don) Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 183.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Nephrodium procerum D. Don, Prodr. Fl. Nepal. 6. 1825.

Plants lithophytic, terrestrial, erect; rhizome creeping, scaly; scales lanceolate, brown, 0.6-1 × 0.3-0.4 cm; frond pinnate, distant, 60-80 × 12-20 cm; stipe 15-30cm, stramineous; lamina lanceolate, pubescent, green, herbaceous, 45-60 × 12-20cm; pinnae alternate, 20-25 pairs, lanceolate, acuminate, middle pair largest, 12-20 × 2-3cm, basal pair gradually decreasing, 8-10 × 1-1.5cm; pinnules deeply lobed, opposite, 10-15 pairs, oblong, entire, acute, pubescent; veins distinct, simple; sori round, submarginal, indusiate, hairy; sporangium globose, golden brown, 345-373 μm; spore reniform, pale, perispore folded, 57×43 μm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 25/07/13, *Nayan Thapa & Dorjay Lama*, 184A(SJCBH), 184B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659m±11.3

Global distribution: Bhutan, China, India, Nepal, Thailand.

Local distribution: Lebong, Ging, Lopchu.

Thelypteris nudata(Roxburgh) Morton,*Contr. U.S. Natl. Herb.* 38(7): 352 , 1974; Thapa, Pterid. of Nepal 95.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 595.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Polypodium nudatum Roxburgh, Calcutta J. Nat. Hist. 4: 491. 1844.

Plants lithophytic, terrestrial, erect ;rhizome creeping, scaly; scales lanceolate, entire, acuminate, 0.4-0.6× 0.1-0.2cm, fronds remote, uni-pinnate, 60-100× 20-30cm; stipe castenus, 20-40 cm; lamina oblong-elliptic, coriaceous, 40-70 × 20-40cm; pinnae sub-opposite, 6-10 pair, sessile, oblong-linear, crenate, broad cuneate, acuminate, 20-40 × 3.5-5 cm, basal pairs gradually reduced, 15-30 × 3-4 cm; veins distinct, prominent; sori median, globose, indurated; sporangium globose, brown, 330-380µm; spore reniform, spinulose, brown, 40×25µm.

Exciccatae : West Bengal, Darjiling hills, Makaibari, 13/12/11, *Nayan Thapa & Dorjay Lama*, 102A(SJCBH), 102B (LBH), N26°23'02.4'' and E088°16'7.1'', Alt: 945m±11.1.

Global distribution: Bhutan, N India, Indonesia, Myanmar, Nepal, Philippines, Vietnam.

Local Distribution: Teesta, Rambhadr, Sukuna

Thelypteris cana(Baker) Ching, Bull. Fan Mem. Inst. Biol. 6(5): 291 1936; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 591. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Nephrodium canum Baker in Hooker & Baker, Syn. Fil. 267. 186.

Pseudocyclosorus canus (Baker) Holttum & Grimes, Kew Bull. 34: 509. 1980.

(Plate 3.13: A to F)

Plants lithophytic, terrestrial, erect ;rhizome sub-erect, glabrous; fronds clustered, uni-pinnate, 60-120 -15-25 cm; stipe stramineous, 20-40cm; lamina lanceolate, pubescent, dark

green, 40-80 × 15-25 cm; pinnae sub-opposite, sub-sessile, 15-20 pairs, lanceolate, acuminate, 15-25 × 2-4 cm, pubescent, middle pinnae largest, basal pinnae gradually reduced, 7-8 × 1-3.5 cm; veins distinct, forked; sori globose, indusiate, brown, hairy; sporangium globose, brown, 330-400 μm; spore reniform, spinulose, brown, 44 × 27 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 18/07/11, *Nayan Thapa & Dorjay Lama*, 033A (SJCBH), 033B (LBH), N27°02'0.4'' and E088°16'15.2'', Alt: 1846 m ± 17.1.

Global distribution: Bhutan, China, India, Nepal.

Local Distribution: Rungdung, Kuresong, Pacheng.

Thelypteris pyrrhorhachis (Kunze) Nayar & Kaur subsp. ***distans*** (Mett.) Fraser.-Jenkins, New Syndrome 213.1997; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 597.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Phegopteris distans Mett., Abh. Senck. Naturf. Ges. (Frankfurt) 2(4): 16. 1858.

Polypodium distans Don, Prodr. Fl. Nepal.: 2. 1825.

Plants lithophytic, terrestrial, erect, rhizome sub-erect, scaly; scales lanceolate, margin hairy, acuminate, 0.6-0.8 × 0.2 cm; fronds pinnate, 100-120 × 20-30 cm; stipe stramineous, pubescent, 30-40 cm; lamina sub-coriaceous, green, pubescent abaxially, 70-80 × 20-30 cm; pinnae sub-opposite, 10-15 pairs, sessile, lanceolate, acuminate, pinnae pair longest at the middle, 30 × 3 cm, lower pair gradually reduced, 10 × 2 cm; segments deeply lobed, 10-20 pairs, opposite, oblong, acute, basal basioscopic segment larger, 1 × .5 cm; veins distinct, forked; sori median, exindusiate; sporangium globose, brown, 243-317 μm; spore reniform, smooth, pale, 38 × 20 μm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 10/01/14, *Nayan Thapa & Dorjay Lama*, 205A (SJCBH), 205B (LBH), N27°04'40.4'' and E088°25'18.2'', Alt: 649 m ± 14.1.

Global distribution: Bhutan, China, India, Nepal, Pakistan, Vietnam.

Local distribution: Teesta, Singla.

Thelypteris ornatipes (Holttum & Grimes)Fraser-Jenkins,New Sp.Syndrome 276.1997; Thapa, Pterid. of Nepal 96.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 596.2008;Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Pseudocyclosorus ornatipes Holttum & Grimes,Kew Bull.34:505.1979.

Plants lithophytic, terrestrial, erect, rhizome sub- erect, scaly; scales ovate, acute, margin hairy,0.4-0.6× 0.2-0.3 cm; fronds pinnate, linear-lanceolate, 60-80 × 10-14 cm; stipe stramineous,15-25cm;lamina linear-lanceolate,pubescent,green,45-55× 10-14 cm; pinnae alternate,8-10 pairs, sessile, lanceolate, acuminate, Pinnae pair largest at mid-half of lamina,14× 2 cm, basal pair gradually reduced; pinnules/segment deeply lobed,lanceolate-elliptic,crenate,acute,1 × 0.4cm,basal acroscopic segments larger,basisopic segment slightly smaller; veins distinct, free, simple; sori median, round, indusiate, reniform;s porangium globose,brown,270-315µm;spore reniform,spinulose,brown,43× 25µm.

Exsiccatae : West Bengal,Darjiling hills, Rungdung,25/09/13, *Nayan Thapa & Dorjay Lama, 204A(SJCBH), 204B (LBH)*,N27°02'0.0.4''and E088°16'15.2'',Alt: 1846m±17.1.

Global distribution: Bhutan,China,India,Nepal

Local distribution:Rungdung,balason,Chungthung.

Thelypteris ornata (Wallich ex Beddome) Ching in Bull. Fan Mem.Inst.Biol.Bot.6.346.1936; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 596. 2008;Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 21.2015.

Polypodium ornatum Wallich ex Beddome.,Ferns South.India:t.171.1864.

Phegopteris ornata Wallich ex Smith, Hist. Fil. 233. 1875.

Macrothelypteris ornata (Wallich ex Smith) Ching, Acta Phytotax. Sin. 8: 309. 1963.

Plants lithophytic, terrestrial, erect; rhizome short, erect, scaly; scales linear-lanceolate, margin ciliated, acuminate, light brown, 1-2× 0.2-0.3 cm; fronds tri-pinnate, 100-250× 40-60cm; stipe stramineous, 40-100 cm, scaly; lamina ovate ,acuminate, pubescent, 60-150× 40-60cm; pinnae sub-opposite,10-20 pairs,stalked,spreading,oblong-lanceolate,acuminate,20-30× 6-10 cm; pinnules sessile, opposite,20-30 pairs, lanceolate, deeply lobed,acuminate,3-5 × 1-2

cm; ultimate lobes opposite, 12-15 pairs, sessile, oblong, entire, apex rounded, 0.5-1 × 0.2-0.3 cm; veins pinnate; sori orbicular, small, single per segment, exindusiate, brown; sporangium ovoid, dark brown, 350 × 280 μm; spore bilateral, perisporate, light brown, 50 × 24 μm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 10/07/13, *Nayan Thapa & Dorjay Lama*, 152A(SJCBH), 152B (LBH), N27°04'40.4'' and E088°25'18.2'', Alt: 649m ± 14.1.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Singla.

Blechnaceae (Presl) Copeland, Gen.Fil.:155.1947.

- 1. Plants erect, 30-110 × 15-30 cm.....2
- + Plants climber, 60-200 × 20-30 cm.....**Stenochlaena**
- 2. Pinnae margin entire, 20-35 pairs.....**Blechnum**
- + Pinnae margin serrate, with sharp teeth, 11-25 pairs.....**Woodwardia**

Blechnum Linnaeus, Sp.Pl.2:1077.1753.

Blechnum orientale Linnaeus, Sp. Pl. 2: 1077. 1753; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 160.1965; Dixit, A Cen. of Indian Pterid. 172. 1984; Thapa, Pterid. Of Nepal 143. 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:206.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 584.636; Fraser-Jenk., Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 22.2015.

(Figure 3.20: A to D)

Plants lithophytic, terrestrial, erect; rhizome ascending, sub-erect, scaly; scales lanceolate, entire, acuminate, 0.8-1 × 0.1-0.2 cm; fronds uni-pinnate, attenuated at both ends, 30-110 × 15-30 cm; stipe stramineous, 10-40 cm, scaly; lamina ovate-lanceolate, monomorphic, broadest at middle, 20-70 × 15-30 cm, sub-leathery; pinnae alternate, 20-35 pairs, sessile, lanceolate, base rounded, margin entire, acuminate, 7.5-15 × 2.5-3.5 cm, basal pinnae gradually reduced into auricle; veins distinct, free, parallel; sori in two rows, along midrib, linear, indusiate, brown; sporangium globose, dark-brown, 375-385 μm, spore reniform, perisporate, bluish-brown, 36-48 μm.

Exsiccatae : West Bengal,Darjiling hills, Rohini, 03/04/12,*Nayan Thapa & Dorjay Lama, 111A (SJCBH), 111B(LBH)*, N26°54'10.5''and E088°20'33.5'',Alt :850m ± 11.5

Global distribution: Australia, Bhutan, China, Bangladesh, India, Nepal, Japan.

Local Distribution:Rohini, Teesta, Majitar,singla, Garidhura.

Stenochlaena Smith, J.Bot.4:149.1841.

Stenochlaena palustris (Burman) Beddome, Suppl. Ferns S. Ind. 26. 1876; Mehra &Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 160.1965; Dixit , A Cen. of Indian Pterid. 173.1984; Thapa, Pterid. Of Nepal 143 . 2002 ; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 584.637; Fraser-Jenk., Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 22.2015.

Polypodium palustre N. L. Burman, Fl. Indica, 234. 1768;

Plants creeping climber, rhizome erect, scaly; scales ovate,entire,acute,0.8-1× 0.4-0.5 cm; Fronds distant, dimorphic, uni-pinnate,60-200× 20-30 cm; stipe stramineus, 10-60 cm, glabrous ;lamina oblong, greyish-green, 50-140 × 20-30 cm; sterile pinnae 6-20 pairs, alternate, sub-sessile, broadly lanceolate, leathery, margin serrate, apex acuminate,10-15× 2-4 cm; veins distinct, simple; pinnae sterile, sori absent.

Exsiccatae : West Bengal,Darjiling hills, Rohini, 03/04/12,*Nayan Thapa & Dorjay Lama, 112A (SJCBH), 112B(LBH)*, N26°54'04.5''and E088°20'23.5'',Alt :650m ± 11.5

Global distribution: Cambodia,China, India, Indonesia, Laos, Malaysia, Nepal, Thailand, Vietnam; Australia, Pacific islands.

Local distribution: Teesta, Melli.

Woodwardia Smith in Mem.Acad.Sci.Turin.5:411.t.9(3).1793.

Woodwardia unigemmata(Makino)Nakai,Bot.Mag.Tokyo 39:103.1952 ;Mehra &Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 160.1965; Dixit , A Cen. of Indian Pterid. 173.1984; Thapa, Pterid. Of Nepal 143 . 2002 ; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh I:207.2005; Fraser-

Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 584.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 22.2015.

Woodwardia himalaica Ching & Wu in C.Y Wu, Fl. Xizangica 1:191.1983.

Woodwardia biserrata Presl, Rel. Haenk. 1:53.1825.

(Plate 3.8:H)

Plants lithophytic, terrestrial, erect; rhizome thick, erect, scaly; scales oblong-lanceolate, entire, acuminate, brown, 1-1.5 × 0.4-0.6 cm; fronds bi-pinnate, tufted, 80-120 × 30-40 cm; stipe 20-30 cm, grooved, thick, scaly at base; lamina deltoid-lanceolate, coriaceous, grayish-green, 60-90 × 30-40 cm; rachis with bulbils; pinnae alternate, sub-sessile, 10-20 pairs, deeply lobed, ovate-lanceolate, acuminate, 15-20 × 2-3 cm; lobes 11-25 pairs, sub-opposite, oblong-lanceolate, margins serrulate, with sharp teeth, acute, 4-6 × 1-1.5 cm; veins distinct, anastomosing, costal aerole present, veins free at margin; sori oblong, on either side of costa, along costal aeroles, indusiate, grayish-brown; sporangium globose, greyish-brown, 370-380 μm; spore reniform, perisporate, pale, 60-65 μm.

Exsiccatae : West Bengal, Darjiling hills, Third Mile, 23/09/11, *Nayan Thapa & Dorjay Lama*, 060A(SJCBH), 060B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Japan, Kashmir, Myanmar, Nepal, Pakistan, Philippines, Vietnam.

Local distribution: Third mile, lebung, Lava.

Woodsiaceae Herter, Revista Sudamer. Bot. 9: 14. 1949.

- 1. Fronds uni-pinnate, 30-40 × 6-8 cm..... **Woodsia**
- + Fronds bi-pinnate to tripinnate, pinnatifid..... 20-300 × 7-100 cm... 2
- 2. Lobes 10-15 pairs..... 3
- + Lobes 2-6 pairs..... **Athyrium**
- 3. Lamina hairy **Deparia**
- + Lamina glabrous..... **Diplazium**

Athyrium Roth, Tent.Fl.Germ.3:58.1799.

1. Frond with perennating bulbils.....*Athyrium clarkei*
- + Fronds without Perennating bulbils.....2
2. Stipe 10-20 cm.....3
- + Stipe 5-10 cm.....*Athyrium pectinatum*.
3. Pinnae 15-20 pairs.....4
- + Pinnae 10-15 pairs.....5
4. Pinnales 10-15 pairs.....*Athyrium distans*
- + Pinnules 5-10 pairs.....*Athyrium flabellatum*
5. Ultimate segment 6 pairs.....*Athyrium fimbriatum*
- + Ultimate segment 4 Pairs.....*Athyrium foliosum*

Athyrium distans (Don)Moore ,Ind.Fil.:125.1859; Thapa, Pterid. of Nepal 100.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 601.2008; Fraser-Jenkins,Kandel & Pariyar, Fern and fern allies of Nepal I:22.2015.

Asplenium distans Don,Prodr.Fl.Nepal.:9.1825.

Athyrium imbricatum Christ,Bull.Acad.Int.Geogr.Bot.Mans 16:123.1906.

Plants terrestrial, erect; rhizome stout, erect, scaly, scales lanceolate, entire, acuminate, brown, 0.8× 0.2 cm; frond bi-pinnate, 40-60× 12-24 cm; stipe stramineous, 10-20 cm; lamina herbaceous , ovate-lanceolate,30-40× 12-24 cm; pinnae alternate,15-20 pairs ,stalked, ascending, lanceolate, acuminate, 6-12× 2-3 cm; pinnules 10-15 pairs, alternate, stalked, oblong, deeply lobed, apex acute,1.5× 0.6 cm; segments 2-4 pairs, opposite, oblong, margin entire, apex acute, 0.4× 0.1 cm; veins hidden; sori oblong,close to costule, indusate, brown; sporangium ovoid, dark brown, 300× 240µm; spore lunar, smooth,hyaline,40× 20µm.

Exsiccatae :WestBengal,Darjiling hills,Third mile,20/10/11, *Nayan Thapa & Dorjay Lama*, 081A(SJCBH), 081B (LBH),N27°00'31.4''and E088°17'37.5'',Alt: 2154m±15.

Global distribution: Bhutan, China, India, Japan, Nepal, Vietnam.

Local distribution: Lepcha jagat, sukhia,pokhriabong.

Athyrium clarkei Beddome, Suppl. Ferns S. Ind. 11. 1876; Dixit , A Cen. of Indian Pterid.126.1984; Thapa, Pterid. of Nepal 99.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a revi. Cen. List 601.2008;Fraser-Jenkins,Kandel & Pariyar, Fern and fern allies of Nepal I:22.2015.

Asplenium clarkei (Beddome) Atkinson ex Clarke, Trans.Linn.Soc.Lond.II Bot.1:489.1880.

(Plate 3.16: A to E)

Plants terrestrial, erect; rhizome erect, stout, scaly; scale ovate – lanceolate, brown, 0.6× 0.4 cm; frond monomorphic, bi-pinnate, 40-60 × 10-12 cm; stipe stramineous, 6-12 cm, glabrous; lamina linear-lanceolate, broadest at middle, herbaceous, adaxially with setae; rachis with proliferating bulbils; pinnae

15-20 pairs, opposite, sub-sessile, lanceolate, acuminate, 5-6× 2-3 cm; pinnules 8-10 pairs, opposite, oblong, shallowly lobed, margin with pointed apices , apex acute, 1-1.5× 0.5-0.9 cm; veins distinct, forked; sori median, linear, 4-6 pairs per pinnules, indusiate, brown; sporangium ovoid, brown, 350× 200µm; spore lunar, smooth, pale , 45× 25µm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 11/07/13, *Nayan Thapa & Dorjay Lama*, 159A(SJCBH), 159B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m±15.

Global distribution: Bhutan, China, India, Myanmar, Nepal.

Local distribution: Lepchajagat, Third mile, Senchel.

Athyrium pectinatum (Wallich ex Mettenius) Moore, Index Fil. 186. 1860; Mehra & Bir , Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 141.1965; Dixit , A Cen. of Indian Pterid.128.1984; Thapa, Pterid. of Nepal.102,2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 602.2008;Fraser-Jenkins,Kandel & Pariyar, Fern and fern allies of Nepal I:23.2015.

Asplenium pectinatum Wallich ex Mettenius, Abh. Senckenberg. Naturf. Ges. 3: 241. 1859.

Plants lithophytic, terrestrial, erect; rhizome long, creeping, scaly; scales lanceolate, entire, acuminate, brown, 0.8 × 0.2 cm; fronds bi-pinnate, 40-60 × 10-18 cm; stipe stramineous, glabrous, 5-10 cm; lamina oblong-lanceolate, acuminate, herbaceous, finely dissected; pinnae alternate, 10-15 pairs, sessile, ascending, lanceolate, acuminate, 5-9 × 2.5-4 cm; pinnules alternate, 5-10 pairs, sessile, finely dissected, lobed, oblong, acute, 1.2-2 × 0.8-1.2 cm; lobes 6 pairs, ascending, oblong, margin shallowly lobed, apex acute, 0.4-0.6 × 0.2-0.3 cm; veins distinct, simple; sori elliptic, on ultimate lobes, indusiate, brown; sporangium ovoid, dark brown, 300 × 270 μm; spore lunar, perisporate, pale, 45 × 30 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 11/07/13, *Nayan Thapa & Dorjay Lama*, 162A(SJCBH), 162B (LBH), N27°00'31.4" and E88°17'37.5", Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Third mile, Meghma, Gayribas.

Athyrium foliolosum Moore ex Sim, Priced Cat. Ferns. 6: 22. 1859; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 144.1965; Dixit, A Cen. of Indian Pterid. 127.1984; Thapa, Pterid. of Nepal 101.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 602. 2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I: 23.2015.

Asplenium fimbriatum Kunze var. *foliosum* (Moore ex Sim), Clarke, Trans Linn. soc. Lond. II Bot. 1: 495. 1880

Plants terrestrial, erect; rhizome short, erect, scaly; scales linear-lanceolate, entire, apex acuminate, 0.6-0.8 × 0.1-0.2 cm; fronds monomorphic, bi-pinnate, 30-60 × 8-18 cm; stipe 10-20 cm; lamina herbaceous, oblong-lanceolate, acuminate, 20-40 × 10-18 cm; pinnae alternate, 10-15 pairs, stalked, broadly lanceolate, acuminate, 4-9 × 2.5-3 cm, basal pinnae reduced, deflexed, 4 × 2.5 cm; pinnules ovate-oblong, deeply lobed, 1-2 × 0.8-1.1 cm;

lobe 4 pairs, opposite, oblong-lanceolate, 0.6× 0.3 cm; veins distinct, forked; sori large, horse shoe shaped, indusiate, brown; sporangium ovoid, dark brown, 300× 240 µm; spore lunar, smooth, hyaline, 40× 18µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, *Nayan Thapa & Dorjay Lama*, 156A(SJCBH), 156B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: Bhutan, China, India, Myanmar, Nepal.

Local distribution: Mangwa, Third mile, Singamari, Lava, chimney.

Athyrium fimbriatum Hooker ex Moore, Index Fil. 185. 1860; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 144.1965; Dixit, A Cen. of Indian Pterid. 127.1984; Thapa, Pterid. of Nepal 101.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 601. 2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:23.2015.

Asplenium fimbriatum Wallich ex Hooker, Sp. Fil. 3: 234.1860.

Athyrium yaklense (Beddome) Panigrahi & Basu, J. Econ Taxon. Bot. 5:1984.

Plants lithophytic, terrestrial, erect; rhizomes short, ascending, scales lanceolate, entire, acuminate, reddish-brown, 0.6-1× 0.2-0.3 cm; fronds monomorphic, tri-pinnate, 40-80× 18-24 cm; stipe stramineous, 8-16 cm, scaly; lamina oblong, acuminate, coriaceous, shining green, 32-64× 18-24 cm; pinnae alternate, 10-15 pairs, stalked, oblong-lanceolate, acuminate, 9-12× 2-4 cm; pinnules alternate, 15-20 pairs, stalked, oblong-lanceolate, acute, basal acroscopic pinnule larger, 2.5× 1.5 cm; segment alternate, 3-4 pairs, oblong, margin toothed, apex acute, 0.5× 0.3 cm; veins distinct, simple; sori median, horse shoe shaped, indusiate, brown; sporangium ovoid, brown, 310× 230 µm; spore lunar shaped, smooth, brown, 40× 26µm.

Exsiccatae : West Bengal, Darjiling hills, Rohini, 03/04/12, *Nayan Thapa & Dorjay Lama*, 117A (SJCBH), 117B (LBH), N26°54'10.5'' and E088°20'33.5'', Alt :850m ± 11.5

Global distribution: Bhutan, China India, Myanmar, Nepal.

Local Distribution: Rohini, lebung, Sidrabong

Athyrium flabellulatum (Clarke) Tardieu, Asplén. Tonkin. 85. 1932; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 144.1965; Dixit, A Cen. of Indian Pterid. 127.1984; Thapa, Pterid. of Nepal 101.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 601.2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:22. 2015.

Asplenium filix-femina (Linnaeus) Bernhardt var. *flabellulata*. Clarke, Trans. Linn. Soc. London, Bot. 1: 493. 1880

Athyrium. tenuifolium Hsieh & Wang in Wu, Fl. Xizangica 1:141.1983.

Plants lithophytic, terrestrial, erect, rhizome short, sub-erect, scaly; scales ovate, entire, acuminate, brown, 0.8 × 0.5 cm; fronds monomorphic, bipinnate, 30-50 × 8-14 cm; stipe stramineous, 10-20 cm; lamina lanceolate, acuminate, broadest at middle, 8-14 × 1.5-3 cm, basal pair gradually reduced, 4 × 1 cm; pinnae alternate, 15-20 pairs, stalked, lanceolate, acuminate, 4-7 × 1.5-3 cm; pinnules sub-opposite, 8-10 pairs, sessile, oblong-ovate, margin crenate, apex mucronate, 0.7-1.5 × 0.4-0.9 cm; veins distinct, forked; sori oblong, median on segments, indusiate, brown; sporangium ovoid, golden-brown, 300 × 250 μm, spore lunar, minutely spinous, brown, 30 × 18 μm.

Exsiccatae: West Bengal, Darjiling hills, Tonglu, 12/07/13, *Nayan Thapa & Dorjay Lama*, 176A (SJCBH), 176B (LBH), N27°02'04.4'' and E088°04'46.5'', Alt: 3050m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Tonglu, Sandhakphu, Phalut, Rechal

Deparia W.J Hooker et R.K Greville, Icon. Fil. Pl. 2: pl. 154. 1829.

1. Fronds tri-pinnate..... *Deparia boryana*

+ Frond uni-pinnate..... 2

2. Pinnae 10-14 pairs..... *Deparia petersenii*

+ Pinnae 16-20 pairs.....*Deparia allantodiodes*

Deparia allantodiodes (Beddome) Kato, J. Fac. sci. Univ. Tokyo III Bot. 13:3 93, f.15.1984; Thapa, Pterid. Of Nepal 107.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 606.2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:24.2015.

Arthyrium allantodiodes Beddome, Ferns Brit. India: t.221.1867.

Lunathyrium sikkimensis Ching Acta Phytotax. Sin. 9(1):72.1964.

(Plate 3.21: A to F)

Plants lithophyte, terrestrial, erect; rhizome creeping, slender, scaly; scales lanceolate, entire, acuminate, brown, 0.6× 0.2 cm; fronds uni-pinnate, pinnatifid, 20-50× 3-10 cm; stipe stramineous, 7-15 cm; lamina ovate-lanceolate, acuminate, herbaceous, pubescent, 13-30× 3-7 cm; pinnae alternate, 16-20 pairs, sessile, deeply lobed to the rachis, lanceolate, acuminate, 1.5-5× 1-1.5 cm, basal pinnae gradually decreasing, smallest, 1.5× 1 cm; lobes alternate, 12-15 pairs, oblong, margin serrated, apex mucronate, .5-0.7× 0.2-0.4 cm; veins distinct, forked; sori median, linear, indusiate, grayish-brown; sporangium ovoid, brown, 380× 260µm; spore bilateral, perisporate, hyaline, 47×30µm.

Exsiccatae : West Bengal, Darjiling hills, Tonglu, 14/07/13, *Nayan Thapa & Dorjay Lama*, 171A(SJCBH), 171B(LBH), N27°02 '04.4'' and E088°04 '46.2'', Alt: 3010m±11.8.

Global distribution: Bhutan, China, India, Japan, Korea.

Local distribution: Tonglu, Sandhakphu, Phalut.

Deparia boryana (Willdenow) Kato, Bot. Mag. (Tokyo). 90: 36. 1977; Thapa, Pterid. of Nepal 107.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 606.2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:25.2015.

Aspidium boryanum Willdenow, Sp. Pl., ed. 4, 5: 285. 1810.

Lastrea boryana (Willdenow) Moore, Ind. Fil.:86.1856.

Nephrodium boryanum (Willdenow) Baker, Syn. Fil.:284.1867.

Plants mesophyte, terrestrial, erect; rhizome horizontal, shortly creeping, scaly; scales lanceolate, entire, acuminate, brown, 0.8× 0.2cm; frond tri-pinnate, sub-coriaceous, 100-200× 60-80 cm; stipe stramineous, 20-60 cm, scaly at base; lamina deltate-ovate, pubescent, herbaceous, green, 80-140× 60-80 cm; pinnae 8-10 pairs alternate, stalked, slightly ascending, oblong-lanceolate, 15-20 × 6-12 cm; pinnules alternate, deeply lobed, sessile, 15-20 pairs, oblong, acuminate, 3-6× 1-1.5 cm; segments alternate, 10-12 pairs, oblong, entire, mucronate, basal pair reduced, 0.5-0.8× 0.2-0.3 cm; veins distinct, forked; sori orbicular, median, indusiate, brown; sporangium ovoid, 300× 240µm; spore reniform to bilateral, perisporate, brown, 40×20µm.

Exsiccatae: West Bengal, Darjilinghills, Third mile, 22/09/11, Nayan Thapa, 058A(SJCBH), 058B (LBH), N27°00'31.5'' and E088°17'37.7'', Alt: 2154m ±15.

Global distribution: Africa, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Third mile, lebung, singamari.

Deparia petersenii (Kunze) Kato, Bot. Mag. (Tokyo). 90: 37. 1977; Thapa, Pterid. of Nepal 108.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:137.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 606.2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:25.2015.

Asplenium petersenii Kunze, Analect. Pteridogr. 24. 1837.

Athyriopsis lasiopteris (Kunze) Ching, Acta Phytotax. Sin. 9:65. 1964.

(Figure 3.19: A to D)

Plants lithophyte, terrestrial, erect; rhizome creeping, slender, scaly; scales lanceolate, entire, acuminate, brown, 0.6× 0.2 cm; fronds uni-pinnate, pinnatifid, 20-45× 7-14 cm; stipe stramineous, 7-15 cm; lamina ovate-lanceolate, acuminate, herbaceous, pubescent, 13-30× 7-14 cm; pinnae alternate, 10-14 pairs, sessile, deeply lobed to the rachis, lanceolate, acuminate, 3.5-7× 2-3 cm; lobes alternate, 8-10 pairs, oblong, margin crisped, apex mucronate, 1-3× 0.3-0.6 cm, basal lobe reduced, smallest, 1× 0.3; veins distinct, forked; sori median, linear, indusiate, grayish-brown; sporangium

ovoid , brown, 367× 250µm; spore bilateral, perisporate, hyaline-brown, 50× 30µm.

Exsiccatae: West Bengal, Darjilinghills, Third mile, 22/09/11, Nayan Thapa, 059A (SJCBH), 059B (LBH), N27°00'31.5'' and E088°17'37.7'', Alt: 2154 m± 15.

Global distribution: Bhutan, China, India, Japan, Korea.

Local distribution: Third mile, Singamari, Lebong.

Diplazium Swartz, J. Bot. (Schrader) 1800(2): 4, 61. 1801.

1. Frond uni-pinnate, 60-140× 20-30 cm.....2
- + Frond bi-pinnate and pinnatifid, 100-300× 30-100 cm.....3
2. Pinnae 15-20 pairs..... *Diplazium stoliczkae*
- + Pinnae 10-15 pairs..... *Diplazium javanicum*
3. Pinnule 15-30 pairs.....4
- + Pinules 8-12 pairs.....6
4. Stipe 50-100 cm..... *Diplazium himalayense*
- + Stipe 10-20 cm.....5
5. Spore spherical, 40-45µm..... *Diplazium kawakamii*
- + Spore bilateral, 48× 30 µm..... *Diplazium forrestii*
6. Scales margin entire, 0.8 -1.5×.2-0.5.....7
- + Scales margin toothed, 1×0.3..... *Diplazium spectabile*
7. Sporangium 350× 250.....8
- + Sporangium 350× 300.....9
8. Spore lunar, 50× 30µm..... *Diplazium esculentum*
- + Spore bilateral, 64× 50µ..... *Diplazium succulentum*
9. Lobes 0.4× 0.2 cm..... *Diplazium maximum*
- + Lobes, 0.6× 0.4 cm..... *Diplazium sikkimensis*

Diplazium esculentum (Retzius) Swartz, J. Bot. (Schrader). 1801(2): 312. 1803; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 148.1965; Dixit, A Cen. of Indian Pteridophytes, 132,1984; Thapa, Pterid. of Nepal,109,2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:161.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List, 584,2008; Fraser-Jenkins, Kandel & Pariyar, Fern and fern allies of Nepal I:25.2015.

Hemionitis esculenta Retzius, Obs.Bot.6:38.1791.

Asplenium esculenta (Retzius) Presl, Rel. Haenk.1:45.1825.

Plants mesophytic, terrestrial, erect; rhizome long, creeping, scaly; scales lanceolate, entire, acuminate, brown, 0.8× 0.2 cm; fronds bi-pinnate to tri-pinnate, green, 100-200× 30-60 cm; stipe stramineous, 20-40 cm; lamina herbaceous, lanceolate to ovate-deltoid, 80-160× 30-60 cm; pinnae alternate, 12-16 pairs, ascending, stalked, lanceolate, acuminate, 15-30× 7-12 cm; pinnules 8-10 pairs, sub-sessile, alternate, broadly lanceolate, margin shallowly lobed, apex acute, 3.5-6× 2-3 cm; veins distinct, anastomosing; sori linear, indusiate, brown; sporangium ovoid, dark-brown, 350 × 250µm; spore lunar, smooth, light brown, 50× 30µm.

Exciccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, Nayan Thapa & Dorjay Lama, 155A(SJCBH), 155B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: Bhutan, China, India, Nepal, Myanmar, Vietnam.

Local distribution: Mangwa, Singla, Teesta.

Diplazium javanicum (Bl.) Makino, Bot.Mag.Tokyo 20:85.1906; Thapa, Pterid. Of Nepal 110,2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 609. 2008 ; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Diplaziopsis javanica (Bl.) Chr., Ind.Fil.:227.1905.

Plant mesophytic, terrestrial, erect; rhizome thick, erect, scaly; scales lanceolate, entire, acuminate, blackish brown, 1× 0.3 cm; fronds uni-pinnate, 60-140× 20-30 cm; stipe stramineous, 20-40 cm; lamina herbaceous, lanceolate, green, 40-100× 20-30 cm; pinnae 10-15 pairs, alternate, subsessile, oblong lanceolate, margin entire, acuminate, 10-15× 2.5-4 cm; veins distinct forming aeroles; sori elongate, linear, indusiate, brown; sporangium ovoid, dark brown, 370× 270µm; spore lunar, perisporate, brown, 50× 33µm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 17/09/13, *Nayan Thapa & Dorjay Lama*, 201A(SJCBH), 201B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659m±11.5.

Global distribution: Bhutan, India, Nepal.

Local distribution: Lebong.

Diplazium sikkimense (Clarke) Christensen, Contr. U.S. Natl. Herb. 26: 304. 1931; Thapa, Pterid. of Nepal 112.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:183.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 611.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Asplenium sikkimense Clarke, Trans. Linn. Soc. London, Bot. 1: 500. 1880.

Plants mesophytic, terrestrial, erect; rhizome thick, horizontal, scaly; scales oblong, toothed, acuminate, light brown, 0.5-1.5× 0.1-0.4 cm; fronds, bipinnate, 200-300 × 30-40 cm; stipe stramineous, 50-100 cm; lamina coriaceous, glabrous, ovate, 150-200× 30-40 cm; pinnae 10-12 pairs, alternate, subsessile, oblong-lanceolate, acuminate, 15-20× 6-8 cm, costa rough, scabrous; pinnules 10-12 pairs, sub opposite, alternate, sessile, oblong, deeply lobed, apex caudate, 3-4× 1.5-2.5cm; lobes oblong, margin serrate, apex mucronate, 0.6× 0.4 cm; veins distinct, forked; sori oblong, indusiate, brown; sporangium ovoid, dark brown, 350× 300µm; spore spherical, smooth, dark brown, 40-45µm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 30/07/13, *Nayan Thapa & Dorjay Lama*, 188A(SJCBH), 188B (LBH), N27°02'00.4'' and E088°16'15.5'', Alt: 1846m±10.5.

Global distribution: China, India.

Local distribution: Rungdung, Third mile.

Diplazium maximum (D. Don) C. Christensen, Index Filic. 235. 1905; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 147.1965; Thapa, Pterid. of Nepal 113.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List. 609.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Asplenium maximum D. Don, Prodr. Fl. Nepal. 8. 1825.

Plants mesophytic, terrestrial, erect; rhizome thick, horizontal, scaly; scales oblong, toothed, acuminate, light brown, 0.5-1.5 × 0.1-0.4 cm; fronds, bipinnate, 200-300 × 30-40 cm; stipe stramineous, 30-70 cm; lamina herbaceous, glabrous, ovate, 170-230 × 30-40 cm; pinnae 10-12 pairs, alternate, sub sessile, oblong-lanceolate, acuminate, 15-20 × 6-8 cm, costa smooth, glabrous; pinnules 10-12 pairs, sub opposite, alternate, sessile, oblong, deeply lobed, apex caudate, 3-4 × 1.5-2.5 cm; lobes oblong, margin serrate, apex mucronate, 0.4 × 0.2 cm; veins distinct, forked; sori oblong, indusiate, brown; sporangium ovoid, dark brown, 360 × 300 μm; spore lunar to reniform, smooth, perisporate, pale, 47 × 24 μm.

Exsiccatae : West Bengal, Darjiling hills, Takdah, 10/07/13, *Nayan Thapa & Dorjay Lama, 148A (SJCBH), 148B (LBH), N27°02'01.4''* and *E088°20' 52.5''*, Alt: 1865m ± 10.5.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Takdah, Third mile, Singamari, Lebong.

Diplazium succulentum (Clarke) Christensen, Index Filic. 240. 1905; Thapa, Pterid. of Nepal 112.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 611.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Asplenium succulentum Clarke, Trans. Linn. Soc. London, Bot. 1: 502. 1880.

(Figure 3.3: A to D)

Plants mesophytic, terrestrial, erect; rhizome creeping, wide, scaly; scales lanceolate, margin toothed, acuminate, light brown, 1 × 0.3 cm; fronds bipinnate, 200-300 × 30-60 cm; stipe stramineous, 40-60 cm; lamina herbaceous, deltoid, acuminate, 160-240 × 30-60 cm; pinnae 8-10 pairs, alternate, stalked, ascending, oblong-lanceolate, acuminate, 15-30 × 8-16 cm; pinnules alternate, 8-10 pairs, alternate, lower pinnules stalked, oblong-lanceolate, margin deeply lobed, apex acuminate, 8-16 × 4-6 cm; lobes alternate, 8 pairs, oblong, entire, apex round, 1-2 × 0.5-0.8 cm, basiscopic lobes larger, 2.1 × 1 cm; veins distinct, forked; sori linear, median, single per lobe, indusiate, brown; sporangium ovoid, dark brown, 350 × 280 μm; spore bilateral, smooth, pale, 64 × 50 μm.

Exsiccatae: West Bengal, Darjilinghills, Gayribas, 25/10/11, *Nayan Thapa*, 085A (SJCBH), 085B (LBH), N27°03'20.5'' and E088°01'23.4'', Alt: 2656 m ± 15.

Global distribution: China, India, Nepal.

Local distribution: Gayribas, Senchel

Diplazium stoliczkae Beddome, *Suppl. Ferns South India Brit. India* :13, t.361. 1876; Mehra & Bir, *Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas* 145.1965; Thapa, *Pterid. of Nepal* 112.2002; Fraser-Jenkins, *Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List* 611.2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and fern-allies of Nepal I*:25.2015.

Diplazium hirsutipes (Beddome) Nayar & Kaur, *Comp. Bedd. Handb. Ferns Brit. India*:44.1974.

Diplazium calogramma Christ, *Not. Syst. (Paris)* 1:45.1909.

Plants mesophytic, terrestrial, erect; rhizome erect, robust, scaly; scales linear lanceolate, margin toothed, acuminate, blackish-brown; fronds unipinnate, 40-60 × 10-20 cm; stipe chestnut coloured, 10-20 cm, scaly; lamina lanceolate, green, 30-40 × 10-20 cm; pinnae 15-20 pairs, alternate, sessile, lanceolate, margin deeply lobed, acuminate, 5-10 × 1-1.5 cm; lobes 15-20 pairs, sub-opposite, oblong, entire, apex round, 0.7 × 0.4 cm; veins distinct, forked; sori median, elongate, along the veins, indusiate, brown;

sporangium ovoid, dark brown, 400× 323µm; spore reniform, perisporate, hyaline, 43× 30µm.

Exsiccatae : West Bengal, Darjiling hills, Chatakpur, 14/07/13, *Nayan Thapa & Dorjay Lama*, 178A(SJCBH), 178B (LBH), N27°00'43.4'' and E088°17'30.5'', Alt: 2253m±15.5.

Global distribution: Bhutan, China, India, Myanmar, Nepal, Taiwan.

Local Distribution: Chatakpur, Lebong, Mungpoo.

Diplazium himalayense (Ching) Panigrahi, *Phytologia* 31(3): 254. 1975; Thapa, *Pterid. of Nepal* 113.2002; Fraser-Jenkins, *Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List* 609.2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and fern-allies of Nepal I*:25.2015.

Allantodia himalayense Ching, *Acta Phytotax. Sin.* 9:55.1964.

Diplazium polypodioides Bl. Var *vestita* (Clarke) Iwats., *Univ. Mus. Univ. Tokyo Bull.* 31:319.1988.

Plants mesophyte, terrestrial, erect; rhizome massive, sub erect, scaly; scales lanceolate, entire, acuminate, brown, 0.8-1.2× 0.2-0.4 cm; fronds bipinnate, pinnatifid, coriaceous, 200-300× 50-100 cm; stipe woody, erect, 50-100 cm, densely scaly; lamina green, ovate, 150-200× 50-100 cm; pinnae 25-30 pairs, alternate, stalked, lanceolate, acuminate, 25-50× 8-16 cm; pinnules alternate, 25-35 pairs, sub-sessile, lanceolate, deeply lobed, acuminate, 4-8× 2-4 cm; lobes oblong, margin dentate, apex round, 1-2× 0.5-1 cm; costules scaly; veins distinct, forked; sporangium ovoid, dark brown, 400× 354µm; spore lunar, perisporate, brown, 50× 37 µm.

Exsiccatae: West Bengal, Darjiling hills, Ragarung, 01/10/11, *Nayan Thapa*, 078A(SJCBH), 078B (LBH), N27°00'20.5'' and E088° 07' 23.4'', Alt: 1985m ±11.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Ragarung, Lebong.

Diplazium spectabile (Wallich ex Mettenius) Ching, Lingnan Sci. J. 15: 278. 1936; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 146.1965; Thapa, Pterid. of Nepal 112.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 611.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Asplenium spectabile Wallich ex Mettenius, Abh. Senckenberg. Naturf. Ges. 3: 240 (seors. 196). 1859.

Asplenium multicaudatum var *triste* Clarke, Trans. Linn.Soc.Lond.II Bot.1:502.1880.

(Plate 3.15:A to F)

Plants mesophytic, terrestrial, erect; rhizome long, creeping, scaly; scales lanceolate, margins toothed, acuminate, blackish-brown 0.8-1 × 0.2-0.3 cm; fronds bi-pinnate, pinnatifid, coriaceous, 100-150 × 30-40 cm; stipe stramineous, dark brown at base, 20-40 cm; lamina deltoid, acuminate, 80-110 × 30-40 cm; pinnae 10-12 pairs, alternate, stalked, ascending, oblong-lanceolate, acuminate, 15-20 × 6-12 cm; pinnules alternate, 8-10 pairs, sessile, oblong-lanceolate, deeply lobed, acuminate, 3-6 × 1-2 cm; lobes 8-10 pairs, oblong, dentate, apex mucronate, 1 × 0.5 cm; veins hidden, forked; sori ovoid, dark brown, 350 × 293 μm; spore reniform, perisporate, smooth, 40 × 27 μm.

Exsiccatae : West Bengal, Darjiling hills, Kuresong, 13/12/11, *Nayan Thapa & Dorjay Lama*, 104A(SJCBH), 104B (LBH), N26°53'03.4'' and E088°17'1.1'', Alt: 1498m ± 10.1.

Global distribution: Bhutan, China India, Nepal.

Local distribution: Lebung, Third mile, Mungpoo.

Diplazium kawakamii Hayata, J. Coll. Sci. Imp. Univ. Tokyo. 30: 435. 1911; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 609.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:25.2015.

Allantodia kawakamii (Hayata) Ching; *A. kingpingensis* Ching, not *A. jinpingensis* W. M. Chu; *Athyrium allanticarpum* Rosenstock; *A. kawakamii* (Hayata) C. Christensen.

Plants mesophytic, terrestrial, erect; rhizome ascending, sub-erect, scaly, scales lanceolate, entire, acuminate, brown, 0.6-1 × 0.2-0.3 cm; fronds monomorphic, bi-pinnate, 40-80 × 10-30 cm; stipe 5-10 cm, stramineous; lamina coriaceous, oblong-lanceolate, dark green, glabrous, 35-70 × 20-30 cm; pinnae alternate, 10 pairs, stalked, ascending, oblong-lanceolate, broadest at base, acuminate, 5-15 × 2-6 cm; pinnules alternate, 15-18 pairs, lanceolate, lobed, acuminate, lobes oblong, entire, apex rounded, 1-1.5 × 0.5-0.7 cm; veins distinct, forked, sori on lobes, linear on veins, indusiate, brown; sporangium ovoid, dark brown, 373 × 284 μm; spore spherical, perisporate, hyaline, 45-50 μm.

Exsiccatae: West Bengal, Darjiling hills, Lebung, 17/09/13, *Nayan Thapa & Dorjay Lama*, 200A (SJCBH), 200B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659 m ± 11.5.

Global distribution: Bhutan, China, India, Nepal, Japan.

Local distribution: Lebung.

Diplazium forrestii (Ching ex Z. R. Wang) Fraser-Jenkins, *Taxon. Revis. Indian Subcontinental Pteridophytes*. 256. 2008; Fraser-Jenkins, Kandel & Pariyar, *Fern and fern allies of Nepal I*: 25. 2015.

Allantodia forrestii Ching ex Z. R. Wang, *Acta Phytotax. Sin.* 32: 82. 1994.

Plants mesophytic, terrestrial, erect; rhizome robust, erect, scaly; scales lanceolate, toothed, entire, acuminate, brown, 1 × 0.2 cm, frond bi-pinnate, pinnatifid, 60-100 × 20-34 cm; stipe stramineous, glabrous, 15-30 cm; lamina ovate, acuminate, herbaceous, 45-70 × 15-30 cm; pinnae alternate, 15-20 pairs, stalked, oblong, acuminate, 10-17 × 5-8 cm; pinnules 15 pairs, alternate, sub-sessile, acroscopic basal pair smallest, lanceolate, lobed to the rachis, acuminate, 2.5-4 × 1-2 cm; lobes 6 pairs, sessile, oblong, crenate, apex rounded, 1.2 × 0.5 cm; veins distinct, forked; sori median, linear, on either side of costule, indusiate, brown; sporangium ovoid, dark brown, 350 × 280 μm; spore bilateral, smooth, pale, 48 × 30 μm.

Exsiccatae : West Bengal,Darjiling hills,Rungdung,30/07/13, *Nayan Thapa & Dorjay Lama, 187A(SJCBH), 187B (LBH),N27°01'16.4''*and *E088°16'24.5''*,Alt: 1586m±8.3.

Global distribution:China, India, Myanmar.

Local distribution: Rungdung,Lebong,

Woodsia elongata Hooker,Sp.Fil.1:62.1844; Thapa, Pterid. of Nepal 108.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 608.2008; Fraser-Jenkins,Kandel & Pariyar, Fern and fern allies of Nepal I:26.2015.

Cheliantopsis elongata Copeland,Univ. Calf.Publ.Bot.12:395.1931.

Plants lithophytic, terrestrial, erect; rhizome creeping, scaly; scales linear, entire, acuminate, brown, 0.6× 0.1 cm; frond monomorphic, uni-pinnate, 30-40× 6-8 cm; stipe, 5-10 cm, chesnut coloured, scaly; pinnae 15-20 pairs, alternate, sessile, pinnatifid, oblong, lobed, apex rounded, pubescent, 3-4× 1.5-2.2 cm, basal pinnae gradually reduced; lobes opposite ,3-6 pairs, oblong, margin entire, apex rounded, pubescent, .7-1.1× 0.4-0.8 cm; veins distinct, simple; sori globose, single per lobes , at vein ending; sporangium globose, brown, 276-285µm, spore spherical. tuberculate, brown, 30-45µm.

Exsiccatae : West Bengal,Darjiling hills,Tonglu,14/07/13, *Nayan Thapa & Dorjay Lama, 171A(SJCBH),171B(LBH),N27°02 '04.4''*and *E088°04'46.2''*,Alt: 3010m±11.8.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Tonglu, Sandhakphu.

Dryopterideaceae Herter, Rev.Sudam.Bot.9:15.1949.

1. Frond monorphic2
- + Fronds monomorphic- dimorphic.....3
2. Lamina uni-pinnate to bipinnate..... 7

- + Lamina tri-pinnate to quadripinnate..... 6
- 3. Costa and costule hairy.....**Tectaria**
- + Costa and costule glabrous.....**Dryopteris**
- 4. Veins distinct, forked.....5
- + Veins distinct, anastomosing6
- 5. Sori restricted to the apices of pinnae.....**Dryopsis**
- + Sori distributed through-out the pinnae.....**Polystichum**
- 6. Pinnae 15-20 pairs..... **Phanerophlebiopsis**
- + Pinnae 3-7 pairs.....**Cyrtomium**
- 7. Stipe purplish,scaly,20-30cm..... 8
- + Stipe stramineus, 10-20 cm..... **Arachniodes**
- 8. Pinnae 10-20 pairs.....**Peranema**
- + Pinnae 8-10 pairs..... **Nothoperanema**

Arachniodes Blume,Enum.Pl.Javae 2:241.1828.

Arachniodes assamica (Kuhn) Ohwi, J. Jap. Bot. 37: 76. 1962; Dixit , A Cens. of Indian Pterid. 147.1984; Thapa, Pterid. of Nepal 116. 2002 ; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 619.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:26 .2015

Aspidium assamicum Kuhn, Linnaea 36: 108. 1869.

Plants lithophytic, terrestrial, erect; rhizome creeping, scaly; scales lanceolate, entire, acuminate,0.6-1.2× 0.2-0.4 cm; fronds tri-pinnate, 40-60× 10-30 cm; stipe stramineus, 10-20 cm; lamina deltoid, acuminate, coriaceous, 30-40× 10-30 cm; pinnae alternate, 6 pairs, stalked,1-2 cm, oblong-lanceolate, acuminate,5-15× 2.5-8cm,lowest pinnae deltoid, forked, bipartite; pinnules 8-10 pairs, sub-opposite, sub-sessile, ascending, rhombic-lanceolate, acroscopic margin serrate , sharply toothed, base cuneate,1.2- 4× 0.6-2 cm; ultimate pinnules inbasal basioscopic pinnae , sub-sessile, ovate,

cuneate, acuminate, 8× 3 cm; veins distinct, forked; sori median, globose, 5-8 pairs per pinnule, indusiate, brown; sporangium ovoid-spherical, dark brown, 300× 280µm; spore bilateral, perisporate, brown, 34× 26µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, *Nayan Thapa & Dorjay Lama*, 147A(SJCBH), 147B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m±10.5.

Global distribution: China, India, Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Mangwa, Takdah, Pokhriabong.

Crytomium Presl, Tent. Pterid.: 84. t. 2. 2f. 19. 1863.

Crytomium caryotideum (Wallich ex Hooker & Greville) C. Presl, Tent. Pterid. 86. 1836; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 129. 1965; Dixit, A census of Indian Pteridophytes 140. 1984; Thapa, Pteridophytes of Nepal 117. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 619. 2008.

Aspidium caryotideum Wallich ex Hooker & Greville, Icon. Filic. 1: t. 69. 1828.

(Plate 3.9:F,G,H)

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scale lanceolate, margin hairy, acuminate, brown, 0.6-0.8× 0.2-0.3 cm; fronds uni-pinnate, oblong-lanceolate, 40-80× 12-20 cm; stipe stramineous, scaly, scales bluish-brown, 10-20 cm; lamina coriaceous, oblong-lanceolate, green, 30-60× 12-20 cm; pinnae alternate, 3-7 pairs, deltate-ovate, base truncate, margin serrate, acroscopic margin with auricle, acuminate, 12-20× 3-5 cm; veins distinct, anastomosing; sori globose, scattered abaxially, indusiate; sporangium globose, 210-215µm; spore reniform, tuberculate, brown, 48-56µm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 15/08/11, *Nayan Thapa & Dorjay Lama*, 051A(SJCBH), 051B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659m±11.3

Global distribution: Bhutan, China, India, Japan, Nepal, Pakistan, Philippines, Vietnam.

Local Distribution: Lebong, Rungdung, Mungpoo

Dryopsis Holttum & Edwards, Kew Bull. 41: 179. 1986.

Dryopsis apiciflora (Wallich ex Mettenius) Holttum & Edwards, *Kew Bull.* 41(1): 189. 1986; Thapa, Pteridophytes of Nepal 118.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 625.2008.

Aspidium apiciflorum Wallich ex Mettenius, Abh. Senckenberg. Naturf. Ges. 2: 338 (seors. 54). 1858.

Dryopteris apiciflora (Wallich ex Mettenius) Kuntze, Revis. Gen. Pl. 2: 812. 1891.

(Plate:3.6)

Plants lithophytic, terrestrial, erect; rhizomes erect, scaly; scales, linear-lanceolate, entire, acute, 0.8-1.2 × 0.1-0.2 cm; fronds uni-pinnate, lanceolate, 30-80 × 10-30 cm; stipe stramineous, 10-30 cm, scaly; lamina coriaceous, green, 20-50 × 10-30 cm; rachis, costa scaly; pinnae opposite, 10-20 pairs, oblong-lanceolate, acuminate, 5-15 × 1.5-2 cm; deeply lobed; segment oblong, entire, obtuse, abaxially glabrous, 1.5-2 × 0.5-0.9 cm; veins distinct, forked; sori globose, restricted to apex, indusiate, brown; sporangium globose, brown, 230-245 μm; spore ellipsoid, minutely spinose, brown, 43-47 μm.

Exsiccatae : West Bengal, Darjiling hills, Meghma, 20/10/11, *Nayan Thapa & Dorjay Lama*, 083A(SJCBH), 083B(LBH), N27°01' 23.4'' and E088°043' 38.2'', Alt: 2700m ± 15.

Global distribution: Bhutan, China, India, Myanmar, Nepal.

Local distribution: third mile, senchel, lava.

Dryopteris Adanson, Fam. des Pl. 2: 20, 551. 1763.

- 1. Fronds dimorphic.....2
- + Fronds monomorphic.....3

- 2. Pinnules lanceolate, margin notched, 1.5 × 0.5 cm.....*Dryopteris marginata*
- + Pinnules oblong, margin entire, 1 × 0.4 cm.....*Dryopteris cochleata*

- 3. Lamina uni-pinnate, 30-100 × 10-20 cm.....4
- + Lamina bi-pinnate, 10-100 × 5-40 cm.....5

- 4. Pinnae 10-15 pairs.....*Dryopteris atrata*
- + Pinnae 20-30 pairs.....*Dryopteris conjugata*

5. Pinnae 2.5-8 × 1-3cm..... 6
 +. Pinnae 10-20× 3-8 cm.....7
 6. Segment 5-10 pairs.....8
 +. Segment 4-6 pairs.....*Dryopteris serratodentata*
 6. Stipe ebenous,10-20cm.....*Dryopteris splendens*
 +. Stipe stramineus, 10-30 cm.....9
 8. Scales 0.6-0.8× 0.2-0.3cm.....*Dryopteris woodsii*
 +. Scales 0.4-0.6× 0.1-0.2 cm.....*Dryopteris juxtaposita*
 9. Segmnet 6-8 pairs.*Dryopteris subimpressa*
 +. Segemnet 10-20 pairs..... *Dryopteris wallichiana* subsp
nepalensis

Dryopteris juxtaposita Christ, Bull. Acad. Int. Géogr. Bot. 17: 138. 1907; Thapa, Pterid. of Nepal 122. 2002 ; Fraser-Jenkins,Tax. Revi. Of Three Hundreed Ind. Subcon. Pterid. With a revi. Cen. List 616.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:27 .2015

Nephrodium filix-mas var. *normalis* Clarke,Trans.Linn.Soc.Lond.II Bot.1:519,t.68,f.2,1880.

Plants lithophytic, terrestrial ,erect;rhizome thick,erect,scaly;scales lanceolate, entire, acuminate,brown,0.4-0.6× 0.1-0.2 cm; fronds ovate-lanceolate,bipinnate,10-60× 8-16cm;stipe stramineus,5-20 cm,scaly at base;lamina coraiceous,green,5-40× 8-16 cm;pinnae 10-15 pairs,sub opposite,sessile,lanceolate,acuminate, 4-8 × 2-3 cm,deeply lobed, pinnae broadest at middle,basal pinnae gradually decreasing; segements 8-10 pairs,oblong,margim serrate,apex serrated,2-3× 1-2cm;veins distinct, forked; sori globose,sub-marginal,indusiate,brown;sporangium globose,brown,270-275µm;spore reniform,perisporate,brown,45-47µm.

Exsciccatae : West Bengal,Darjiling hills,Third Mile,01/10/11, *Nayan Thapa & Dorjay Lama*, 077A(SJCBH), 077B (LBH),N27°00'31.4''and E088°17'37.5'',Alt: 2154m±15.

Global distribution: Bhutan,China, India, Kashmir, Nepal.

Local Distribution: Third mile, Singamari

Dryopteris marginata (Clarke) Christ, Philipp. J. Sci., C. 2: 212. 1907; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 133.1965; Dixit, A Cens. of Indian Pterid. 151.1984; Thapa, Pterid. of Nepal 123. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 616.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:27. 2015

Nephrodium filix-mas (Linnaeus) Richard var. *marginatum* C. B. Clarke, Trans. Linn. Soc. London, Bot. 1: 521. 1880.

Nephrodium marginatum Hope in Jour. Bombay Nat. Hist. Soc., 14, 740, t.38.1903.

Plants lithophytic, terrestrial, erect; rhizome erect, scaly; scales lanceolate, entire, acuminate, light brown, 0.8-1 × 0.2-0.3 cm; fronds bi-pinnate, dimorphic, fertile fronds narrower, 50-90 × 10-20 cm; stipe stramineous, 30-45 cm in fertile fronds, 5-15 cm in sterile fronds; lamina herbaceous, lanceolate, 20-45 × 10-20 cm; pinnae alternate, 8-12 pairs, sessile, lanceolate, acuminate, 5-10 × 2.5-3.5 cm; sterile pinnules sessile, oblong, serrated, obtuse, 2 × 1 cm; fertile pinnules contracted, lanceolate, margin notched, acute, 1-1.5 × 0.3-0.5 cm; veins distinct, forked; sori sub-marginal, globose, indusiate, brown; sporangium globose, brown, 230-240 μm; spore reniform, perisporate, hyaline, 35-40 μm.

Exsiccatae: West Bengal, Darjiling hills, Lebong, 16/08/11, *Nayan Thapa & Dorjay Lama*, 052A(SJCBH), 052B(LBH), N27°04' 13.4'' and E088°16' 57.5'', Alt: 1648m ± 12.

Global distribution: Bhutan, India, Myanmar, Nepal, Thailand, Vietnam.

Local Distribution: Lebong, Takdah.

Dryopteris wallichiana (Sprengel) Hylander subsp. **nepalensis** Fraser-Jenkins, New Sp. Syndr. Indian Pteridol. 134.1997; Thapa, Pterid. of Nepal 126. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 618.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:28. 2015

Plants lithophytic, terrestrial, erect, rhizome ascending, erect, scaly; scales lanceolate, entire, acuminate, dark brown, 0.6-1 × 0.2-0.3 cm; fronds bi-pinnate, 60-100 × 20-30 cm, stipe stramineous, 10-30 cm, scaly; lamina ovate-lanceolate, green, 50-70 × 20-30 cm; pinnae alternate, 20-30 pairs, sub-sessile, lanceolate, deeply lobed, acuminate, 10-15 × 2.5-3.5 cm; segments 10-20 pairs, oblong, margin cartilaginous, apex round, 1.2-1.7 × 0.5-0.8 cm; veins distinct, forked; sori globose, indusiate, brown; sporangium globose, dark-brown, 310-320 μm; spore reniform, perisporate, brown, 40 × 25 μm.

Exsiccatae : West Bengal, Darjiling hills, Meghma, 11/07/13, *Nayan Thapa & Dorjay Lama*, 166A(SJCBH), 166B(LBH), N27°01' 23.4'' and E088°043' 38.2'', Alt: 2700m ± 15.

Global distribution : Bhutan, India, Japan, Malaysia, Myanmar, Nepal.

Local distribution: Meghma, Senchel.

Dryopteris woodsii Hayata, Icon. Pl. Formosan. 6: 158. 1916; Thapa, Pterid. of Nepal 126.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 618.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 28. 2015

Dryopteris tenuissima Tagawa, Acta Phytotax. Geobot. Kyoto 1: 308, 1932.

(Plate 3.8: I)

Plants lithophytic, terrestrial, erect; rhizome ascending, erect, scaly; scales ovate, entire, acuminate, 0.6-0.8 × 0.2-0.3 cm; fronds uni-pinnate, 20-45 × 8-15 cm; stipe cataneous, 4-7 cm; lamina ovate-lanceolate, 16-38 × 8-15 cm; pinnae sub-opposite, 10-20 pairs, sub-sessile, deeply lobed, ovate-lanceolate, acuminate, largest at middle, 7.5 × 3 cm, lower pinnae gradually decreasing, 4 × 1.5 cm; segments sub-opposite, 5-10 pairs, oblong, margin toothed, apex round, 1-1.5 × 0.5-0.7 cm; sporangium globose, dark brown, 300-310 μm; spore lunar, grayish, tuberculate, 48-55 μm.

Exsiccatae : West Bengal, Darjiling hills, Third Mile, 23/05/13, *Nayan Thapa & Dorjay Lama*, 123A(SJCBH), 123B(LBH), N27°00' 31.4'' and E088°17' 37.5'', Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Nepal, Thailand.

Local Distribution: Third mile, Singamari, lava.

Dryopteris splendens (Hooker) Kuntze, Revis. Gen. Pl. 3: 813. 1891; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 133.1965; Dixit, A Cens. of Indian Pterid. 154.1984; Thapa, Pterid. of Nepal 125. 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:290.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 617.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:27.2015

Nephrodium splendens Hooker, Sp. Fil. 4: 126. 1862.

(Plate 3.19: D to F)

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales linear-lanceolate, entire, acuminate, 0.6-0.8 × 0.1-0.2 cm, brown; fronds bi-pinnate, monomorphic, 50-90 × 20-40 cm; stipe ebenous, 10-20 cm; lamina lanceolate, coriaceous, 40-70 × 20-40 cm; pinnae alternate, sub-sessile, 15-20 pairs, lanceolate, acuminate, 10-20 × 3-4 cm; pinnules sub-opposite, 15-20 pairs, sessile, oblong, margin notched, acroscopic base cuneate, apex mucronate, 1.5-2 × 0.4-0.6 cm; veins distinct, forked; sori median, closed to costules, round, indusiate, brown; sporangium globose, dark brown, 270-275 μm; spore spherical, tuberculate, brown, 40-45 μm.

Exsiccatae : West Bengal, Darjiling hills, Meghna, 11/07/13, *Nayan Thapa & Dorjay Lama*, 165A(SJCBH), 165B(LBH), N27°01'23.4'' and E088°043.2'37.5'', Alt: 2700m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Meghna, Senchel.

Dryopteris atrata (Wallich ex Kunze) Ching, Sinensia. 3: 326. 1933; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 130.1965; Dixit, A Cens. of Indian Pterid. 148.1984; Thapa, Pterid. of Nepal 120.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 614.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:26.2015

Aspidium atratum Wallich ex Kunze, Linnaea 24: 279. 1851.

Dryopteris gambeli (Hope)Chr.,Index Fil.,267,1905

Plants lithophytic,terrestrial,erect;rhizome sub-erect, robust, scaly;scales linear-lanceolate,entire,acuminate, dark brown,0.8-1.5× 0.2-0.3cm; fronds uni-pinnate,ovate-lanceolate,30-60× 10-20cm;stipe greenish,10-20 cm,scaly at base;lamina herbaceous,20-40× 10-20cm;pinnae sub-opposite,10-15 pairs,sessile,base truncate,margin dentate,acuminate,7.5-15× 2-3.5 cm;veins distinct ,forked;sori scattered abaxially,globose,indusiate,brown;sporangium globose,dark-brown,260-270µm;spore reniform,perisporate,brown,40-45µm.

Exsiccatae : West Bengal,Darjiling hills,Damsong,03/01/11, *Nayan Thapa & Dorjay Lama*, 001A(SJCBH), 001B (LBH),N27°08'21.4''and E088°34'47.5'',Alt: 1825m±12.8.

Global distribution:Bhutan,China, India, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

Local distribution: Damsong,Lopchu

Dryopteris cochleata (Buchanan-Hamilton ex D. Don) C. Christensen, Index Filic. 258. 1905; Dixit , A Cens. of Indian Pterid. 150.1984; Thapa, Pterid. of Nepal 121. 2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 615.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:27 .2015

Nephrodium cochleatum Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 6. 1825.

Plants lithophytic,terresterail,erect;rhizome ascending,denely scaly;scales lanceolate,entire,acuminate,light-brown,0.8-1.6× 0.2-0.3 cm;fronds bi-pinnate,dimorphic, fertile fronds narrower,coraiceous, 40-80× 10- 18 cm;stipe stamineus, 20-45 cm in fertile fronds,10-20 cm in sterile fronds; lamina lanceolate, 20-35× 10-18cm;pinnae alternate,10-12 pairs ,stalked,lanceolate,acuminate,5-9× 2-3cm;pinnules oblong,margin serrate, obtuse,basisopic pinnule longer,1-3× 0.3-0.5 cm,fertile pinnules, oblong, entire,narrow,contracted,1× 0.4 cm ; veins distinct, forked; sori globose,

indusiate, dark- brown, in two rows, on either side of costules; sporangium globose, dark brown, 270-280µm; spore reniform, perisporate, pale-brown, 50-55µm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 17/09/13, *Nayan Thapa & Dorjay Lama*, 202A(SJCBH), 202B(LBH), N27°04 '13.4'' and E088°16' 57.5'', Alt: 1648m±12.

Global Distribution: Bangladesh, Bhutan, China India, Indonesia, Myanmar, Nepal, Philippines, Thailand.

Local distribution: Lebong, balasan.

Dryopteris serratodentata (Beddome) Hayata, Icon. Pl. Formosan. 4: 179. 1914; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 131.1965; Dixit, A Cens. of Indian Pterid. 153.1984; Thapa, Pterid. of Nepal 124. 2002 ; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 617.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:27 .2015

Lastrea filix-mas (Linnaeus) Presl var. *serratodentata* Beddome, Suppl. Ferns Brit. Ind. 55. 1892.

Nephrodium serrato-dentatum Hope in Jour. Bombay Nat. Hist. Soc ., 12, 622, t.10, 1899.

(Figure 3.1: A to D)

Plants lithophytic, terrestrial, erect; rhizome ascending, short, scaly; scales ovate-lanceolate, margin serrate, acuminate, brown, 0.6-0.8 × 0.2-0.3 cm; fronds bi-pinnate, coriaceous, 10-40 × 5-10 cm; stipe stramineous, 4-10 cm, scaly; lamina oblong-lanceolate, green, 6-30 × 5-10 cm; pinnae 5-10 pairs, sub-opposite, sessile, deeply lobed, oblong – lanceolate, apex obtuse, 2.5-5 × 1-2.5 cm; lobes 4-6 pairs, oblong, serrated, apex round, 1-2.5 × 0.4-1.3 cm; veins distinct, forked; sori globose, indusiate, brown; sporangium globose, dark-brown, 270-280µm; spore reniform, perisporate, dark brown, 44-47µm.

Exsiccatae : West Bengal, Darjiling hills, Sandhakphu, 21/07/11, *Nayan Thapa & Dorjay Lama*, 038A(SJCBH), 038B(LBH), N27°07 '41.4'' and E088°05'29.5'', Alt: 3521m±11.8.

Global distribution: Bhutan, China, India, Kashmir, Myanmar, Nepal, Pakistan.

Local distribution: Sandhakphu, Phalut

Dryopteris conjugata Ching, Bull. Fan Mem. Inst. Biol., Bot. 11: 63. 1941; Thapa, Pterid. of Nepal 122. 2002 ; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 615.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 27. 2015

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales ovate-lanceolate, entire, acuminate, brown, 0.8-1.2 × 0.2-0.4 cm; fronds uni-pinnate, monomorphic, 60-100 × 15-30 cm; stipe 10-25 cm, ebenous, scaly, scales linear, dark-brown; lamina lanceolate, acuminate, widest at middle, 50-75 × 15-30 cm; pinnae alternate, 20-30 pairs, sessile, lanceolate, lobed, acuminate, 9-15 × 1.5-2.5 cm, basal pinnae smaller, 7 × 1.5 cm; veins distinct, forked; sori scattered abaxially, globose, indusiate, brown; sporangium globose, dark brown, 320-325 μm; spore reniform, perisporate, pale, 45-53 μm.

Exsiccatae : West Bengal, Darjiling hills, meghma, 11/07/13, *Nayan Thapa & Dorjay Lama*, 163A (SJCBH), 163B (LBH), N27°01'55.4'' and E088°04'44.5'', Alt: 2674m ± 11.3

Global distribution: China, India, Nepal.

Local Distribution: Meghma, Damsong

Dryopteris subimpressa Loyal, Nova Hedwigia. 16(3-4): 467. 1969; Dixit, A Cens. of Indian Pterid. 154. 1984; Thapa, Pterid. of Nepal 125. 2002 ; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 618.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 38. 2015

Dryopteris submarginata Loyal in Mehra, Res Bull. Punjab Univ. n.s. 12(1-2) : 153. 1961, *nom nud*.

Plants lithophytic, terrestrial, erect; rhizome wide, creeping, scaly; scales ovate, entire, acuminate, pale, 0.8 × 0.3 cm; frond bi-pinnate, coriaceous, 60-100 × 20-40 cm; stipe stramineous, 10-30 cm, scaly; lamina deltoid-lanceolate, green, 50-70 × 20-40 cm; pinnae alternate, 10-20 pairs, stalked,

oblong-lanceolate, acuminate, 10-20 × 4-8 cm; pinnules 12-15 pairs, basal pinnules opposite, upper pinnules alternate, sessile, oblong-lanceolate, deeply lobed, acuminate, 2-4 × 1-2 cm; lobes opposite, 6-8 pairs, oblong, margin serrate, apex obtuse, serrate, 0.5-1 × 0.2-0.5 cm; veins distinct, forked; sori orbicular, single per segment, indusiate, brown; sporangium ovoid, dark brown, 300 × 245 μm; spore ellipsoid, perisporate, papillate, brown, 50 × 30 μm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 26/10/11, *Nayan Thapa & Dorjay Lama*, 095A(SJCBH), 095B(LBH), N27°04 '13.4'' and E088°16' 57.5'', Alt: 1648m ± 12.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Lebong, Mangwa.

Nothoperanema (Tagawa) Ching, Acta Phytotax. Sin. 11: 25. 1966.

Nothoperanema squamiseta (Hooker) Ching, Acta Phytotax. Sin. 11(1): 27. 1966; Thapa, Pterid. Of Nepal 128. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a Revi. Cen. List 620. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 28. 2015.

Nephrodium squamisetum Hooker, Sp. Fil. 4: 140, t. 268. 1862.

Dryopteris squamiseta (Hooker) Kuntze, Revis. Gen. Pl. 2: 813. 1891.

Lastrea buchanani Bedd. Handb. Ferns Brit. India: 225. 1883.

(Plate 3.18: A to F)

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly, ovate, entire acuminate, brown, 1.2-1.5 × 0.3-0.4 cm; fronds tripinnate, pubescent, 60-80 × 22-30 cm; stipe purplish, scaly, 20-30 cm; lamina ovate, acuminate, coriaceous, 40-50 × 22-30 cm; pinnae stalked, lanceolate, subopposite, 8-10 pairs, basal pair largest, 22-30 × 6-8 cm; pinnules alternate, sub-sessile, 8-10 pairs, oblong-lanceolate, acute, 3-4 × 1.5-2 cm; ultimate segments sub-opposite, 7-9 pairs, ovate-oblong, base cuneate, apex round, 0.8 × 0.4 cm; veins distinct, forked; sori globose, at vein ending, indusiate, brown; sporangium globose, dark brown, 253-265 μm; spore reniform, spinose, brown, 40 × 25 μm.

Exsiccatae : West Bengal,Darjiling hills,Meghma,11/07/13, *Nayan Thapa & Dorjay Lama*, 167A(SJCBH), 167B (LBH),N27°01'55.4''and E088°04'44.5'',Alt: 2674m±11.3

Global distribution:Bhutan,China, India; Africa, Madagascar.

Local Distribution: Meghma,Dhotrey,Newra.

Peranema D. Don, Prodr. Fl. Nepal. 12. 1825.

1. Fronds tri-pinnate,40-120× 20-40 cm.....2
- + Fronds Quadripinnate, 80-120 ×30-40cm.....*Peranema paleolulata*
2. Stipe scaly,dark brown, 1.8-2 × 0.2-0.4 cm.....*Peranema cyatheoides*
- + Stipe scaly,setose,light brown, 0.6-0.8 × 0.1-0.2 cm...*Peranema aspidioides*

Peranema cyatheoides Don,Prodr.Fl.Nepal.:12,1825; Dixit , A Cen. of Indian Pterid. 146,1984; Thapa, Pterid. of Nepal 128.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 613.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:28 .2015

Sphaeropteris barbata Wallich,Plant.Asiat.Rar.:42,1830.

Plants lithophytic, terrestrial, erect, rhizome erect, short, densely covered with scales ;scales linear-lanceolate, entire, acuminate, dark brown,1.8-2 × 0.2-0.4 cm ;fronds tufted,tri-pinnate,80-120× 30-40cm;stipe purplish, 20-30 cm, scaly, 1.8-2 × 0.2-0.4 cm ; lamina deltate-ovate,coriaceous,60-80× 30-40cm;pinnae alternate,15-20 pairs, ovate-lanceolate, basal pair largest,30 × 8cm;pinnules deeply lobed, lanceolate,3-4 × 1-1.2cm;segment sessile, oblong, obtuse,0.5 × 0.2cm;veins distinct, simple, free; sori stalked, globose, capsulated, hard; sporangium globose, dark brown, 230-245µm;spore globose, smooth, light brown,45-50µm.

Exsiccatae : West Bengal,Darjiling hills,Third mile,04/05/11, *Nayan Thapa & Dorjay Lama*, 009A(SJCBH), 009B (LBH),N27°00'35.4''and E088°17'34.5'',Alt: 2174m±15.3

Global distribution:Bhutan,China,India,Nepal,Pakistan,Taiwan

Local distribution:Third mile,Senchel.

Peranema aspidioides(Blume)Mett.Fil.Lechl.2:33,1850; Dixit , A Cen. of Indian Pterid.146.1984; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 613.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:28 .2015.

Diacalpe aspidioides (Blume)Enum.Pl.Jav.241.1828.

Plants lithophytic, terrestrial, erect, rhizome erect, short, scaly ;scales linear-,entire, acuminate, light brown,0.6-0.8 × 0.1-0.2 cm ;fronds tufted,tripinnate,40-80× 20-30cm;stipe purplish, 10-20 cm, scaly, setose, 0.6-0.8 × 0.1-0.2 cm; lamina ovate,coriaceous,30-60× 20-30cm;pinnae alternate,10-15 pairs, broad lanceolate, basal pair largest,30 ×7 cm; pinnules oblong, deeply lobed,3-3.5× 1.2-1.5 cm; segment sessile,oblong,obtuse,0.5 × 0.2cm;veins distinct, simple, free; sori shortly stalked, globose, capsulated ,hard ; sporangium globose, dark brown,240-250µm;spore globose, smooth,pale,45-50µm.

Exsiccatae : West Bengal, Darjiling hills,Third mile,01/10/11, *Nayan Thapa & Dorjay Lama*, 080A(SJCBH), 080B (LBH),N27°00'35.4''and E088°17'34.5'',Alt: 2174m±15.3

Global distribution: Bhutan,China,India,Nepal,Pakistan,Taiwan

Local distribution: Third mile,Senchel,lava.

Peranema paleolulata(Pich Sermoi)*Fraser-Jenkins*, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 317 . 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:28 .2015

Acophorus paleolulatus Pich Sermoi,*Webbia* 31(1): 252, 1977.

Plant lithophytes, terrestrial, erect, rhizome sub-erect, scaly; scales lanceolate, entire, acuminate, brown, 0.8× 0.2 cm; Fronds quadripinnate, herbaceous,80-120 ×30-40cm, stipe purplish, scabrous, 20-40cm; lamina deltoid, reddish when young, greenish at maturity,60-80× 30-40cm; pinnae opposite,8-10pairs, oblong-lanceolate, acuminate, pinnae base swollen, 15-20× 4-6 cm; pinnules opposite,10-15 pairs, oblong, basioscopic pinnules larger,4-6×1-2 cm; ultimate segments sub-opposite,5-7 pairs, rhomboid, acrosopic base cuneate, apex round,0.5-1× 0.2-0.4 cm; veins distinct, forked; sori median, globose, indusiate; sporangium globose,brown,267-273µm; spore spherical, smooth, brown,40-45µm.

Exsiccatae : West Bengal,Darjiling hills,meghma,11/07/13, *Nayan Thapa & Dorjay Lama*, 164A(SJCBH), 164B (LBH),N27°01'55.4'' and E088°04'44.5'',Alt: 2674m±11.3

Global distribution: Bhutan,China,India, Myanmar, Nepal ,Taiwan.

Local Distribution:Meghma, Gayribas, Thirdmile,Lebong.

Phanerophlebiopsis Ching, Acta Phytotax. Sin. 10: 115. 1965.

Phanerophlebiopsis hookeriana (Presl)Fras.-Jenkins,Himal.Ferns:42,1997; Thapa, Pterid. of Nepal 128.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 620.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:29.2015.

Lastrea hookeriana Presl,Trent.Pterid.:77,1836.

Polystichum hookerianum Chr.,Ind.Fil.:67,1905.

Crytomuim hookerianum (Presl)Chr.,Ind.Fil.Suppl.I:101,1913.

(Plate 3.9:I)

Plants lithophytic,terrestrial,erect,rhizomeshort,erect,scaly;scales lanceolate, acuminate,brown,0.4-0.6× 0.1-0.2 cm;fronds tufted,uni-pinnate,30-70 × 15-20 cm; stipe stramineus,scaly at base, 10-30cm; lamina coriaceous, lanceolate, 20-40× 15-20cm; pinnae alternate, 15-20 pairs, sub-sessile, lanceolate,margin toothed,apex acute,acrosopic base auricled,7.5 × 2cm; sori large,round,scattered, indusiate, brown; sporangium globose,golden-brown,220-230µm;spore reniform, tuberculate, brown,40-44µm.

Exsiccatae : West Bengal,Darjiling hills,Mungpoo,`1/10/11, *Nayan Thapa & Dorjay Lama, 079A(SJCBH), 079B (LBH),N27°00'31.4''*and *E088°17'37.5''*,Alt: 2154m±15.3

Global distribution:Bhutan,China,India,Nepal,Taiwan,Vietnam.

Local Distribution: Mungpoo,Takdah.

Polystichum Roth,Trent.Fl.Germ.3:31,69.1799.

1. Plants terrestrial, 12-100× 2-30 cm.2
- + Plants epiphytic, 5-15× 1-1.5 cm.....11
2. Rachis with perennating bulbils or buds.....3
- + Rachis without perennating bulbils or buds.....
3. Fronds bi-pinnate.....4
- + Fronds uni-pinnate..... *Polystichum lentum*
4. Stipe length 4-20 cm..... *Polystichum miamense*
- + Stipe length 20-60 cm..... *Polystichum scariousum*
5. Pinnae 7.5-15× 2.5-3.2 cm in size.....6
- + Pinnae 1.5-3× 0.5-1.5 cm in size.....7
6. Pinnules 1.5-2× 0.4-0.6 cm in length.... *Polystichum neobelatum*
- + Pinnule 1.2-1.6 × 0.3-0.5 cm in length..... *Polystichum semifertile*
7. Lamina with microscales abaxially..... *Polystichum nepalense*
- + Lamina without microscales.....8
8. Scales bullate1.2-1.5× 0.7-0.9 cm.....*Polystichum mehrae*
9. Scales ovate-lanceolate, 0.6-0.8 × 0.1-0.4cm..... 10

10. Spore grayish-brown, 46-50µm..... *Polystichum prescottianum*
 +. Spore dark brown, 50-55µm.....*Polystichum stenophyllum*
 11. Sporangium ovoid, 310× 230µm..... *Polystichum thomsonii*
 +. Sporangium globose, 300-310µm..... *Polystichum atkinsonii*

Polystichum atkinsonii Beddome, Suppl. Ferns S. Ind. 14. 1876; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 126.1965; Dixit, A cen. of Indian Pterid. 156.1984; Thapa, Pterid. of Nepal 129.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 620.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:29.2015.

Aspidium atkinsonii Clarke, Trans. Linn. Soc. Lond. II Bot. 1:506. 1880.

Polystichum franchetii Christ, Bull. Soc. Fr. 52 Mem. 1:28. 1905.

Polystichum gemmiferum Tagawa, Acta Phytotax. Geobot. 3:31. 1934.

Plants epiphytic, pendent; rhizome erect, short, scaly; scales ovate-lanceolate, entire, acuminate, 0.4-0.6 × 0.1-0.2 cm; fronds uni-pinnate, 5-10 × 1-1.5 cm; stipe stramineous, 1-3 cm, scaly; lamina coriaceous, lanceolate, 4-7 × 1-1.5 cm; pinnae 10-15 pairs, sub-opposite, sub-sessile, ovate-oblong, margins notched, toothed, apex acute, acroscopic base auriculate, 0.6 × 0.4 cm; veins distinct, forked; sori median, on veinlets, indusiate, brown; sporangium globose, dark-brown, 300-310µm; spore spherical, tuberculate, brown, 53-55µm.

Exsiccatae : West Bengal, Darjiling hills, Meghma, 25/10/11, *Nayan Thapa & Dorjay Lama*, 087A(SJCBH), 087B(LBH), N27°01' 23.4'' and E088°043' 38.2'', Alt: 2700m±15.

Global distribution: Bhutan, China India, Japan, Nepal.

Local distribution: Meghma, Gayribas, Rechala.

Polystichum lentum (D. Don) T. Moore, Index Fil. 86, 95. 1858; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 126.1965;

Dixit , A cen.of Indian Pterid.158.1984; Thapa, Pterid.of Nepal 131.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 62.,2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:29.2015.

Aspidium lentum D. Don, Prodr. Fl. Nepal. 4. 1825.

Aspidium auriculatum (Linnaeus) Swartz var. *lentum*(D. Don) C. B. Clarke, Trans. Linn. Soc.Lond.II Bot.1:507.1880

Plants lithophytic, terrestrial, erect; rhizome erect, scaly; scales ovate, margin entire, acuminate, brown, 0.6-0.8 × 0.4-0.5 cm ; fronds uni-pinnate 30-50 × 4-6 cm; stipe castaneus, 5-10cm, scaly; lamina linear-lanceolate, leathery, green, with proliferating gemma, 25-40 × 4-6 cm; pinnae alternate, 20-25 pairs, stalked, basal pairs deflexed, rest at right angle to rachis, lanceolate, auricled on acroscopic side, margins serrate, toothed, apex acute, 2-3 × 0.8-1.5 cm; veins distinct, free; sori large, circular, 5-8 pairs per pinnae, indusiate, brown; sporangium, globose, dark brown, 270-280 μm; spore spherical, spinose, brown, 33-39 μm.

Exciccatae : West Bengal, Darjiling hills, Third Mile, 15/07/11, *Nayan Thapa & Dorjay Lama*, 025A(SJCBH), 025B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Lebung, Singamari, Lava.

Polystichum manmeiense (Christ) Nakaike, Misc. Publ. Nat. Sci. Mus. Tokyo. 141. 1982; Thapa, Pterid. of Nepal 131.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 622.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:29.2015.

Aspidium manmeiense Christ, Bull. Herb. Boissier 6: 965. 1898.

Polystichum nepalense var. *subbipinnatum* Christensen, Contrib. U.S. Natn. Herb. 26: 284. 1931.

Plants lithophytic, terrestrial, erect; rhizome ascending, scaly; scales linear-lanceolate, entire, acuminate, brown, 0.4-0.6 × 0.1-0.2 cm; Fronds bipinnate, 15-50 × 4-8 cm; stipe stramineous, 4-20 cm, scaly; lamina oblong-lanceolate, acuminate, abaxially with micro scales, 11-30 × 4-8 cm; rachis with bulbils; pinnae alternate, 10-15 pairs, stalked, lanceolate, deeply lobed, acute, 2-4 × 1.2-2.3 cm, abaxially scaly; lobes 4-6 pairs, alternate, oblong, margins with sharp teeth, acute, 0.6-0.8 × 0.2-0.4 cm; basal acroscopic lobes largest, lobed to pinnae rachis, ovate, 0.8-1.2 × 0.5-0.6 cm; veins distinct, forked; sori round, on either side of costa, indusiate, brown; sporangium globose, dark brown, 310-320 μm; spore spherical, minutely spinose, brown, 47-53 μm.

Exsiccatae : West Bengal, Darjiling hills, Meghna, 12/07/13, *Nayan Thapa & Dorjay Lama*, 172A(SJCBH), 172B(LBH), N27°01' 23.4'' and E088°043' 38.2'', Alt: 2700m ± 15.

Global distribution: Bhutan, China, India, Nepal, Taiwan.

Local distribution: Meghna, Dhotrey, rechala.

Polystichum mehrae Fraser-Jenkins & Khullar, Indian Fern J. 2(1, 2): 10. 1985; Thapa, Pterid. of Nepal 131. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 622. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 29. 2015.

Plants lithophytic, terrestrial, erect; rhizome sub-erect, scaly; scales bullate, entire, aristate, dark brown, 1.2-1.5 × 0.7-0.9 cm; frond bipinnate, 12-30 × 2-4 cm; stipe stramineous, 4-6 cm, scaly; lamina coriaceous, lanceolate, 8-24 × 2-4 cm; pinnae 10-20 pairs, sub-opposite, deeply lobed, sessile, ovate, acuminate, 1-2 × 0.5-1 cm; lobes 1-4 pairs, alternate, ovate, margin entire, apex sharp, acute, 0.2-0.5 × 0.1-0.2 cm, basal acroscopic lobe largest, 0.8 × 0.4 cm; veins distinct, forked; sori spherical, on either side of costules, indusiate,

brown; sporangium globose, dark-brown, 320-325 μm ; spore reniform, tuberculate, brown, 50-54 μm .

Exsiccatae : West Bengal, Darjiling hills, Meghma, 12/07/13, *Nayan Thapa & Dorjay Lama*, 170A(SJCBH), 170B(LBH), N27°01 '23.4'' and E088°043' 38.2'', Alt: 2700m \pm 15.

Global distribution: Bhutan, China, India, Nepal, Pakistan, Taiwan.

Local distribution: Meghma, Gorkhey, Dhotrey.

Polystichum neolobatum Nakai, Bot. Mag. (Tokyo). 39: 118. 1925; Dixit, A Cen. of Indian Pterid. 158. 1984; Thapa, Pterid. of Nepal 132. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 623. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 29. 2015.

Polystichum lobatum var *chinensis* Christ, Nuov. Giorn. Bot. Ital. n.s. 4: 92. 1897.

Polystichum neolobatum var *brevipinnum* Tagawa, Acta Phytotax. Geobot. 9: 92. 1940.

Plants lithophytic, terrestrial, erect; rhizome erect, scaly; scales ovate-lanceolate, entire, acuminate, 0.8-1.5 \times 0.3-0.6 cm; fronds bi-pinnate, 30-60 \times 10-18 cm; stipe stramineous, 10-20 cm, scaly, scales brown; lamina ovate-lanceolate, coriaceous, 20-40 \times 10-18 cm; pinnae alternate, 15-20 pairs, sessile, lanceolate, acute, 5-9 \times 2-3 cm; pinnules alternate, 4-9 pairs, ovate, base cuneate, margin with sharp teeth, acuminate, 1.5-2 \times 0.4-0.6 cm; veins distinct, forked; sori orbicular, on either side of costa, indusiate, brown; sporangium globose, golden-brown, 300-310 μm ; spore globose, spinulose, bluish brown, 37-43 μm .

Exsiccatae : West Bengal, Darjiling hills, Lebong, 17/09/13, *Nayan Thapa & Dorjay Lama*, 203A(SJCBH), 203B(LBH), N27°04 '13.4'' and E088°16' 57.5'', Alt: 1648m \pm 12.

Global distribution: Bhutan, China, India, Japan, Nepal.

Local distribution: Lebung, Mungpoo, Newra Source.

Polystichum prescottianum (Wallich ex Mettenius) T. Moore, Index Fil. 101. 1858; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 127.1965; Dixit, A Cen. of Indian Pterid. 159.1984; Thapa, Pterid. of Nepal 133.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 623.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:29.2015.

Aspidium prescottianum Wallich ex Mettenius, Abh. Senck. Naturf. Ges. 2: 48.1858.

Polystichum castaneum (Clarke) Nayar & Kaur, Comp. Bedd. Handb. Ferns Brit. India. 1974.

(Plate 3.12:A to D)

Plants lithophytic, terrestrial, erect; rhizome ascending, scaly; scales ovate, entire, acute, glossy, brown, 0.6 × 0.4 cm; fronds bi-pinnate 30-40 × 3-5 cm; stipe 5-10 cm, densely scaly; lamina lanceolate, acuminate, shining green, 25-30 × 3-5 cm; pinnae 20-25 pairs, alternate, sessile, ovate, acute, deeply lobed, 2-2.7 × 0.7-0.9 cm; lobes sub-opposite, 4-6 pairs, oblong, margins toothed, acuminate, 0.5 × 0.3 cm, abaxially scaly, micro-scales present; veins distinct, forked; sori orbicular, singly in each lobe, indusiate, brown; sporangium globose, brown, 330-340 μm; spore spherical, tuberculate, grayish-brown, 46-50 μm.

Exsiccatae: West Bengal, Darjiling hills, Tonglu, 14/07/13, Nayan Thapa & Dorjay Lama, 169A(SJCBH), 169B(LBH), N27°02'04.4'' and E088°04'46.2'', Alt: 3010m ± 11.8.

Global distribution: Afghanistan, Bhutan, China, India, Nepal.

Local distribution: Tonglu, Sandhakphu, Phalut

Polystichum stenophyllum (Franchet) Christ, Bull. Soc. Bot. France. 52(Mém.1) : 27. 1905; Dixit, A Cen. Of Indian Pterid. 160.1984; Thapa, Pterid. of Nepal 134.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred

Ind. Subcon. Pterid. With a revi. Cen. List 624.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:30.2015.

Aspidium caespitosum Wallich ex Mettenius var. *stenophyllum* Franchet, Pl. David. 2: 155. 1888.

Polystichum stenophyllum var. *abbreviatum* Tagawa, Acta Phytotax. Geobot. 3: 93. 1934.

Plants lithohytes, terrestrial, erect; rhizome ascending, sub-erect, scaly; scales lanceolate, margins ciliate, acuminate, $0.6-0.8 \times 0.1-0.2$ cm; fronds uni-pinnate, $15-60 \times 2-4$ cm; stipe stramineous, 5-15 cm, scaly; lamina linear-lanceolate, acuminate, $10-45 \times 2-4$ cm; rachis scaly, proliferating bulbil present; pinnae alternate, 10-20 pairs, sub-sessile, oblong, base cuneate, auricled at acroscopic side, margin serrulate, apex acute, middle pinnae largest, 2×1 cm, basal pinnae gradually smaller, 1.6×0.7 cm; veins distinct, forked; sori orbicular, median, on either side of pinnae, indusiate, brown; sporangium globose, brown, $340-350 \mu\text{m}$; spore spherical, tuberculate, dark-brown, $50-55 \mu\text{m}$.

Exsiccatae : West Bengal, Darjiling hills, Meghna, 12/07/13, *Nayan Thapa & Dorjay Lama*, 168A(SJCBH), 168B(LBH), N27°01'23.4'' and E088°043'38.2'', Alt: 2700m±15.

Global distribution: Bhutan, China, India, Japan, Myanmar, Nepal.

Local distribution: Meghna, Dhotrey.

Polystichum semifertile (C. B. Clarke) Ching, Lingnan Sci. J. 15(3): 398. 1936; Dixit, A Cen. of Indian Pterid. 159. 1984; Thapa, Pterid. of Nepal 134. 2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 623. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:30. 2015.

Aspidium aculeatum (Linnaeus) Swartz var. *semifertile* C. B. Clarke, Trans. Linn. Soc. London, Bot. 1: 509. 1880.

Polystichum longipinnulum Nair, Amer. Fern J. 64:15. 1974.

Plants lithophyte, terrestrial, erect; rhizome ascending, scaly; scale linear, entire, acute, brown, 0.6-0.8 × 0.1-0.2 cm, fronds bi-pinnate, 60-100 × 15-30 cm; stipe stramineous, 15-30 cm, smooth; lamina oblong-ovate, coriaceous, 45-70 × 15-30 cm; pinnae alternate, 10-20 pair, sub-sessile, lanceolate, acuminate, basal pinnae largest, 7.5-15 × 2.5-3.2 cm; pinnules alternate, 15-20 pairs, sub-sessile, rhomboid-oblong, margin serrate, cuneate, auricled acroscopically, apex acute, 1.2-1.6 × 0.3-0.5 cm; veins distinct, forked; sori orbicular, large, 4-6 pairs per pinnules, indusiate, brown; sporangium ovoid, dark brown, 250-270 μm; spore spherical, minutely spinose, 43-47 μm.

Exciccatae : West Bengal, Darjiling hills, Third Mile, 01/10/11, *Nayan Thapa & Dorjay Lama*, 069A(SJCBH), 069B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m ± 15.

Global distribution: Bhutan, China, India, Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Third mile, Chatakpur, Senchel.

Polystichum scariosum (Roxburgh) C. V. Morton, Contr. U.S. Natl. Herb. 38: 359. 1974; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 623.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:30.2015.

Polypodium scariosum Roxburgh, Calcutta J. Nat. Hist. 4: 494.

Plants lithophytic, terrestrial, erect; rhizome short, ascending, sub erect, scaly; scales dimorphic, large scales ovate-oblong, entire, acuminate 1.4 × 0.6 cm, smaller scales linear-lanceolate, sub-entire, toothed, acute, brown, 0.6 × 0.1 cm; Fronds bi-pinnate, 60-180 × 16-24 cm; stipe stramineous, 20-60 cm densely scaly; scales similar to rhizome's; lamina coriaceous, greyish-green, oblong-lanceolate, 40-120 × 16-24 cm; rachis with proliferating buds; pinnae alternate, 10-15 pairs, sub-sessile, lanceolate, acuminate, 8-12 × 3-5 cm; pinnules alternate, 15-20 pairs, sessile, dimidiate, rhomboid, base cuneate, margin shallowly lobed, auricled at acroscopic side, apex sharp, acute, 1.5-

2.5× 0.4-0.6 cm; veins distinct, forked; sori scattered along pinnules, orbicular, indusiate, brown; sporangium ovoid, 310-320µm; spore spherical, tuberculate, brown; 54-57µm.

Exsiccatae: West Bengal, Darjilinghills, Dhotrey-Balasan, 30/06/13, Nayan Thapa & Dorjay Lama, 144A(SJCBH), 144B(LBH), N26°59'14.4'' and E088°14'34.8'', Alt: 1907m±11.7.

Global distribution: China, India, Japan, Sri Lanka, Thailand, Vietnam.

Local distribution: Dhotrey-balasan, Lebong, Ging.

Polystichum nepalense (Sprengel) C. Christensen, Index Filic. 84. 1905; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 126.1965; Dixit, A Cen. of Indian Pterid. 158.1984; Thapa, Pterid. of Nepal 132.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 623. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 29.2015.

Aspidium nepalense Sprengel, Syst. Veg. 4: 97. 1827.

Aspidium marginatum Wallich ex Mett.; Hope, J. Bomb. Nat. Hist. Soc. 14: 459, t. 17. 1902.

Plants lithophytic, terrestrial, erect; rhizome ascending, sub erect, scaly; scales linear-lanceolate, entire, acuminate, brown, 0.8-1 × 0.1-0.2 cm; frond uni-pinnate, 30-60 × 3-6 cm; stipe stramineous, 10-15 cm, scaly; pinnae contracted at base, lanceolate, acuminate, abaxially with micro scales, 20-45 × 3-6 cm; rachis without proliferating bulbils; pinnae alternate, ascending, 20-25 pairs, sub-sessile, lanceolate, auricled at acroscopic side, base oblique, margin entire, apex acute, 1.5-3 × 1-1.5 cm; veins distinct, forked; sori orbicular, in two rows, on pinnae, indusiate, brown; sporangium ovoid, dark brown, 390-400µm; spore spherical, tuberculate, dark brown, 55-60µm.

Exsciccatae : West Bengal,Darjiling hills,Mangwa,10/07/13, *Nayan Thapa & Dorjay Lama*, 146A(SJCBH), 146B (LBH),N27°03'01.4''and E088° 23'52.5'',Alt: 1267m±10.5.

Global distribution: Bhutan, China, India, Myanmar, Nepal, Philippines, Vietnam.

Local distribution:Mangwa,Takdah.

Polystichum thomsonii (Hooker) Beddome, Ferns Brit. India. 1: t. 126. 1866; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 127.1965; Dixit , A Cen. of Indian Pterid.160.1984; Thapa, Pterid.of Nepal 135.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 624.2008.

Aspidium thomsonii J. D. Hooker, Cent. Ferns, t. 25. 1860.

Dryopteris gracilis(moore ex Beddome) Ching ,Bull.Fan Mem. Inst.Biol. 8:455. 1938.

Plants epiphytic,pendent; rhizome short,erect, scaly; scales lanceolate, entire, acuminate, 0.6× 0.2 cm; fronds uni-pinnate, 8-15 × 1-1.5 cm; stipe 1-2 cm, stramineus, scaly; lamina linear-lanceolate, acuminate, dark green,7-13× 1-1.5cm; pinnae 10-15 pairs, alternate, sub-sessile,broadest at middle, basal pair gradually decreasing , ovate, margin shallowly lobed, apex acute, acroscopic base auriculate, 0.5-0.8× 0.3-0.4 cm; veins distinct, simple; sori median, close to midrib, indusiate, brown; sporangium ovoid, brown, 310×230µm,spore spherical,minutely spinouse, brown, 45-56µm.

Exsciccatae : West Bengal,Darjiling hills, Gayribas,25/10/11, *Nayan Thapa & Dorjay Lama*, 088A(SJCBH), 088B (LBH),N27°03'33.5''and E088°01' 27.9'',Alt: 2532m±12.8.

Global distribution:Afghanistan, Bhutan, China, India, Myanmar, Nepal, Pakistan.

Local distribution: Gayribas ,Rechala.

Tectaria Cavanilles, Ann. Hist. Nat. 1: 115. 1799.

1. Frond unipinnate, 30-80× 10-25cm.....*Tectaria polymorpha*

- + Frond Bipinnate to tripinnate, 20-100× 6-40 cm.....2.
- 2. Fronds monomorphic, 40-100× 10-40cm*Tectaria codnuta*
- + Fronds dimorphic, 20-40× 6-20cm.....*Tectaria fuscipes*

Tectaria fuscipes (Wallich ex Beddome) C. Christensen, Contr. U.S. Natl. Herb. 26: 290. 1931; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 135.1965; Thapa, Pteridophytes of Nepal 136.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II:637.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. List 626.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:30.2015.

Lastrea fuscipes Moore, Ind. Fil.:82, 1858.

Aspidium fuscipes Wallich ex Beddome, Suppl. Ferns S. Ind. 15. 1876.

Plants lithophytic, erect, terrestrial; rhizome ascending, scaly; scales lanceolate, entire, acuminate, 0.8-1.2× 0.1-0.2cm; fronds dimorphic, deltate, bi-pinnate, 20-40× 6-20; stipe small, scaly, 4-8cm; lamina elliptic, ovate, acuminate, fertile lamina smaller, 20-40× 6-10cm; sterile lamina larger, 20-40× 10-20cm; pinnae opposite, 3-5 pairs, basal pair largest, triangular, acuminate, 6-20× 4-8cm; middle pairs lanceolate, deeply lobed, acuminate, 4-16× 2-5 cm; segment oblong, opposite, 4-8 pairs, margins, mucronate, acute, 1.5-3× .8-1.5cm; veins distinct, reticulate; sori globose, 3-5 pairs in lobes, indusiate, brown; sporangium globose, dark brown, 287-293µm; spore spherical, perisporate, brown, 48-56µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 03/04/12, Nayan Thapa & Dorjay Lama, 114A (SJCBH), 114B (LBH), N27°03'01.4'' and E088° 23' 52.5'', Alt: 1267m±10.5.

Global distribution: Bhutan, China, India, Indonesia, Myanmar, Nepal, Vietnam.

Local Distribution: Mangwa, Takdah, Lopchu.

Tectaria coadunata (J. Smith) C. Christensen, Contr. U.S. Natl. Herb. 26: 331. 1931; Dixit , A census of Indian Pterid.142.1984; Thapa, Pterid. of Nepal 136. 2002 ; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh II:633.2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a rev. Cen. Lis. 626,2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:30.2015.

Sagenia coadunata Smith in Hooker, J. Bot. 4:184. 1841.

Aspidium coadunatum Wallich ex Hooker & Greville.Ic.Fil.2:202,1831.

Plants lithophytic,terrestrial,erect;rhizome horizontal,scaly;scales lanceolate, entire, acuminate,brown,0.6-0.8× 0.2-0.3cm;fronds tri-pinnate,ovate-deltate,40-100× 10-40cm; stipe stramineous, 10-30cm; lamina ovate, herbaceous,pubescent adaxially ,glabrous abaxially,green,30-70× 10-40cm;pinnae sessile,5-8 pairs, alternate,ovate-lanceolate,deeply lobed,5-20×4-10cm;segments ovate-oblong, crenate,acute,5× 2.5 cm,veins distinct, reticulate;sori reniform,sub-marginal,in two rows,indusiate; sporangium globose,brown,283-293µm;spore reniform,perispore folded,brown,48-54µm.

Exsiccatae : West Bengal,Darjiling hills,Mangwa,03/04/12, *Nayan Thapa & Dorjay Lama, 115A(SJCBH), 115B (LBH),N27°03'01.4''* and *E088°23 '52.5''*,Alt: 1267m±10.5.

Global distribution: Africa, Bhutan, China,India, Laos, Madagascar ,Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

Local Distribution:Mangwa,Mungpoo,Rungdung

Tectaria polymorpha (Wallich ex Hooker) Copeland, Philipp. J. Sci., C. 2: 413. 1907; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 135 .1965; Dixit , A cen. of Indian Pterid.144.1984; Thapa, Pterid. of Nepal 136.2002; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh II: 653.2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 627.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:31.2015.

Aspidium polymorphum Wallich ex Hooker, Sp. Fil. 4: 54. 1862.

(Figure 3.12:A to C)

Plants lithophytic,terrestrial,erect;rhizome Sub-erect,scaly;scales linear- ipe lanceolate,margin lacerated, acuminate,brown,0.6-1.2× 0.1-0.2cm;fronds deltate,uni-pinnate,30-80× 10-25cm;stipe stramineus,10-20 cm,scaly;lamina coriaceous,20-60× 10-25cm;pinnae opposite,3-8 pairs,sessile,oblong,base round,margin entire,apex acuminate,10-25× 5-7cm,basal pinnae forked, bipartite; veins distinct,reticulate;sori scatterd,globose,indusiate, brown; sporangium globose, dark-brown,220-230µm;spore spherical, perisporate ,light brown,34-38µm.

Exsiccatae:WestBengal,Darjilinghills,Teesta,02/02/12,*NayanThapa, 105A (SJCBH), 105B (LBH)*,N27°04'40.05''and E088°25'18.26'',Alt: 366m±9.

Global distribution: Bhutan, Cambodia, India, Indonesia, Malaysia, Nepal, Philippines, Sri Lanka, Thailand, Vietnam

Local distribution: Teesta, Rungdung,Mungoo.

Elaphoglossaceae Pichi-Sermolli in *Webbia* 23:209.1968.

1. Frond 10-60× 4-8 cm with perennating bulbils.....**Bolbitis**

+ Frond 10-20× 0.5-1.5 cm without perennating bulbils.....**Ephaloglossum**

Bolbitis Schott, Gen.Fil.:Pl.:13.1835.

1. Veins anastomosing forming 4-6 costal aerole.....*Bolbitis heteroclita*

+ Veins free ,forked without costal aerole.....*Bolbitis appendiculata*

Bolbitis appendiculata (Willdenow) Iwatsuki, Acta Phytotax. Geobot. 18: 48. 1959; Thapa, Pterid. Of Nepal 140.2002; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh I:368.2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 346.2008; Fraser-Jenkins,Kandel & Pariyar, Fern and fern allies of Nepal I:32.2015.

Acrostichum appendiculatum Willdenow, Sp. Pl. 5: 114. 1810.

Polybotrya appendiculata (Wenowilld)Smith, Ferns Brit.Foreign:111.1866.

Bolbitis helferiana (Kunze)Iwats.,Acta Phytotax.Geobot.Kyoto 18:48.1959.

Plants lithophytic, terrestrial, erect; rhizome wide, creeping, densely scaly; scales blackish-brown, lanceolate, margin toothed, acute; 0.2-0.4 × 0.1-0.2 cm; frond dimorphic, uni-pinnate, sterile fronds 30-60× 6-8 cm, fertile fronds 10-30× 2-3 cm; stipe stramineous, scaly, 5-10 cm in sterile fronds, 5-20 cm in fertile fronds; sterile lamina lanceolate, acuminate, herbaceous, 25-50× 6-8 cm, rachis with perennating bulbils; pinnae alternate, 15-20 pairs, sessile, oblong, serrate, apex round, 3 × 1 cm; fertile lamina, linear, acuminate, 5-10× 2-3 cm; pinnae 10 pairs, alternate, stalked, lanceolate, entire, acute, covered with sori; veins distinct, free, forked; sori acrostichoid, exindustrial, brown; sporangium ovoid, 400× 364µm; spore spherical, perisporate, hyaline to pale, 50-54µm .

Exsiccatae : West Bengal, Darjiling hills, Rohini, 03/04/12, *Nayan Thapa & Dorjay Lama*, 110A (SJCBH), 110B(LBH), N26°54'10.5'' and E088° 20'33.5'', Alt :850m ± 11.5

Global distribution: Bangladesh, Bhutan, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Rohini, Rambi.

Bolbitis heteroclita (Presl) Ching in Christensen, Index Filic., Suppl. 3: 48. 1934; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 136.1965; Dixit , A Cen. of Indian Pterid. 161.1984; Thapa, Pterid. of Nepal 141.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I:375.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 630.2008 ;Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:32.2015.

Acrostichum heteroclitum Presl, Reliq. Haenk. 1: 15. 1825.

Acrostichum flagelliferum Wallich ex Hooker & Greville, Ic. Fil.: t.23.1827

Plants lithophytes, terrestrial, erect; rhizome wide, creeping, long, scaly; scales lanceolate, entire, acuminate, brown, 0.3-0.8 × 0.1-0.2 cm; fronds dimorphic, fertile frond simple, 10-30 × 4-5 cm; stipe 4-10 cm, rough, dirty brown; sterile frond pinnate, 20-80 × 5-8 cm; stipe 5-20 cm, rough, brown; pinnae 2-4 pairs, opposite, sub-sessile, broadly lanceolate, base cuneate, margin entire, 8-16 × 3-6 cm, terminal pinnae long, acuminate with bulbil, 8-25 × 3-6 cm; veins distinct, anastomosing, forming costal areole; sori acrostichoid, exindusiate, brown; sporangium ovoid, 450 × 370 μm; spore spherical, perisporate, brown, 50-54 μm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/07/13, *Nayan Thapa & Dorjay Lama*, 151A (SJCBH), 151B (LBH), N27°03'01.4'' and E088°23'52.5'', Alt: 1267m ± 10.5.

Global distribution: Bangladesh, China, India, Indonesia, Japan, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam.

Local Distribution: Mangwa, Teesta, Kalijhora.

Elaphoglossum Schott ex J. Sm., J. Bot. (Hooker) 4: 148. 1841, *nom. cons.*

Elaphoglossum stelligerum (Wallich ex Baker in Hooker & Baker) Moore in Sal. Ind. Fil.: 89.1857; Dixit, A Cen. of Indian Pterid. 166.1984; Thapa, Pterid. of Nepal 142.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 632.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I: 32.2015.

Acrostichum stelligerum Wallich ex Baker in Hooker & Baker, Syn. Fil. ed. 2: 521.1874.

Elaphoglossum yunnanense (Baker) Ching, Contrib. U.S. Natn. Herb. 26: 327.1931.

Plants lithophytic, terrestrial, erect; rhizome ascending, erect, scaly; scales linear-lanceolate, margin ciliate, apex acuminate, 0.4-0.6 × 0.1 cm; fronds dimorphic, simple, 10-20 × 0.5-1.5 cm; stipe 3-4 cm in sterile frond, castenous, scaly, 6-9 cm in fertile frond, castenous, scaly; fertile lamina coriaceous, thick, narrower, linear, apex acute, 11 × 0.5 cm; sterile lamina broad, sub-coriaceous, lanceolate, acuminate, 13 × 1.5 cm; veins distinct, forked; sori scattered on fertile lamina, exindusiate, brown; sporangium ovoid, brown, 310-320 μm; spore elliptic, perisporate, brown, 43-47 μm.

Exsiccatae : West Bengal,Darjiling hills,Mangwa,10/07/13, *Nayan Thapa & Dorjay Lama*, 157A(SJCBH), 157B (LBH),N27°03'01.4''and E088° 23' 52.5'',Alt: 1267m±10.5.

Global distribution:Bhutan, China, India, Indonesia, Malaysia, Nepal, Philippines, Vietnam.

Local distribution: Mangwa,Rohini

Nephrolepidaceae Ponce de Leon ex Pich-Sermolii in *Webbia* 29:8.1975.

Nephrolepis cordifolia (Linnaeus) C. Presl, Tent. Pterid. 79. 1836; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 121 .1965; Dixit , A cen. of Indian Pterid.167.1984; Thapa, Pterid. of Nepal 137.2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 629.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:32.2015.

Polypodium cordifolium Linnaeus, Sp. Pl. 2: 1089. 1753.

Aspidium auriculatum (Linnaeus)Swartz in Schrad .J.Bot. 1800(2):31.1801.

Plants lithophytic to epiphytic, erect; rhizome thin, long, creeping, stolons with scaly tubers; scales lanceolate, toothed, acuminate, pale, 0.9× 0.2 cm; fronds monomorphic, uni-pinnate, 50-100× 3-6 cm; stipe scaly,10-20 cm; lamina linear-lanceolate, sub-coriaceous,40-80× 3-6 cm;pinnae 40-100 pairs, lanceolate, margin serrate, apex acute, auricled on acroscopic side, 1.5-3× 0.6-1.3 cm; veins prominent, forked; sori sub-marginal, kidney shaped, indusiate, brown; sporangium ovoid, dark brown, 300× 256µm; spore reniform, smooth, dark brown, 36× 24µm.

Exsiccatae : West Bengal,Darjiling hills,Mangwa,10/07/13, *Nayan Thapa & Dorjay Lama*, 153A(SJCBH), 153B (LBH),N27°03'01.4''and E088° 23' 52.5'',Alt: 1267m±10.5.

Global distribution: Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam.

Local distribution: Mangwa, lopchu, Takdah

Oleandraceae (Smith) Ching ex Pichi-Sermolli in *Webbia* 20:745.1965.

Oleandra Cavanilles in *Ann.Hist.Nat.*1(2):115.1799.

1. Frond arises verticillately in groups on a Phyllopodia
.....*Oleandra pistillaris*

+. Fronds arise singly or in group on Phyllopodia but not verticillately
arranged.....*Oleandra wallichii*

Oleandra pistillaris (Swartz)Chr., *Index Fil. Suppl.* III: 132. 1934; Dixit , A Cen, of Indian Pterid. 168.1984; Thapa, Pterid. of Nepal 137. 2002; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pter. With a revi. Cen. List 629.2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and Fern-allies of Nepal* I:33.2015.

Aspidium pistillare Swartz, *Schrad. J. Bot.* 1800(2): 30. 1801; Tagawa & K.Iwats., *Fl. Thailand* 3: 182. 1985.

Oleandra neriiformis auct. non Cav.: *Bedd., Handb. Ferns Brit. India:* 285, f. 146. 1883.

Plants epiphytic, pendent; rhizome wide, creeping, scaly; scales ovate-lanceolate, margin hairy, acuminate, 0.5-0.9 × 0.2-0.4cm; fronds simple, clustered, 10-30 × 2-4cm; stipe 1-3 cm, pubescent; lamina elliptic-oblong, margin entire, apex acuminate, 9-26 × 2-4cm; veins distinct, forked; sori median, on either side of rachis, indusiate, indusium reniform, entire; sporangium reniform, slightly elongated, 257-264µm; spore spherical, brown, perisporate, spinulose, 37-46µm.

Exsiccatae : West Bengal,Darjiling hills,lebong,26/09/11, *Nayan Thapa & Dorjay Lama*, 065A(SJCBH), 065B (LBH),N27°04'13.4''and E 088° 16' 59.5'',Alt: 1659m±11.5.

Global distribution: Bhutan,China,India,Malaya,Nepal,Vietnam.

Local Distribution:Lebong, Rungdung ,Mungpoo,Kuresong,.

Oleandra wallichii(Hooker)Presl,Trent.Pterid:78.1836; Beddome, Handb. ferns Brit.India:287.t.147.1883; ching and S.K. Wu in Fl. Xizangica 1:281.1983; Mehra &Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 121.1965; Dixit , A Cen. of Indian Pterid.167.1984; Thapa, Pterid. of Nepal 137. 2002; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh II:427. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundreed Ind. Subcon. Pterid. With a rev. Cen. List 629. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 33.2015.

Aspidium wallichianum Hooker,Exotic .Fl.1:t.5.1823.

(Figure 3.14 : A to D)

Plants epiphytic, pendent;r hizome wide, creeping, scaly; scales ovate-lanceolate, margin hairy,acuminate,0.5-0.7 × 0.2-0.3cm;fornds simple,1-2 cm apart, 20-40× 3-5cm;stipe 1-3 cm ,pubescent; lamina elliptic-oblong, margin entire, hairy,apex acuminate,17-35× 3-5cm;veins distinct, forked; sori median, on either side of rachis, indusiate, indusium reniform, entire; sporangium reniform, slightly elongated,167-173µm;spore spherical,brown, perisporate,spinulose,44-48µm.

Exsiccatae : West Bengal,Darjiling hills,Third mile,04/05/11, *Nayan Thapa & Dorjay Lama*, 006A(SJCBH), 006B (LBH),N27°00'31.4''and E 088° 17' 37.5'',Alt: 2154m±15.

Global distribution: Bhutan,China,India,Malaya,Nepal,Vietnam.

Local Distribution: Third mile,Singamari,Chimney,Ragarung.

Davalliaceae M. R. Schomb. ex A. B. Frank, Reis. Br.-Guiana [Ri. Schomburgk]. 883. 1848.

- 1. Fronds 15-30 × 6-12 cm2
- + Fronds 30-60 × 10-16 cm **Leucostegia**
- 2. Pinnae 5-10 pairs..... **Davallia**
- + Pinnae 10-15 pairs.....**Katoella**

Davallia Smith, Mém. Acad. Sci. Turin 5: 414. t. 9(6). 1793

Davallia trichomanoides Blume, Enum. Pl. Jav.: 238. 1828; Dixit, A cen. of Indian Pterid. 170. 1984; Thapa, Pterid. of Nepal 139. 2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 234. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List. 634. 2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 34. 2015.

Leucostegia griffithiana (Hooker) Smith, Hist. Fil.: 84. 1875.

Davallia griffithii (Hooker) Christ in Bull. Boiss. II 4: 616. 1904.

Plants epiphytic, pendent; rhizome wide, creeping, scaly; scales ovate-lanceolate, margin with bristle, acuminate, 0.8-1.2 × 0.2-0.4 cm; frond tripinnate, coriaceous, 18-30 × 6-12 cm; stipe stramineous, 6-10 cm; lamina deltoid, pentagonal, acuminate, 12-20 × 6-12; pinnae alternate, 5-10 pairs, stalked, lanceolate, acute, basal pair largest, 12 × 5 cm; pinnules alternate, 4-6 pairs, stalked, ovate, basal basiscopic pinnule largest, 2.5 × 1.5 cm; segments oblong, crenate, acute, 0.5 × 0.2 cm; veins distinct, forked; sori terminal, indusiate, half cup shaped, brown; sporangium globose, dark-brown, 280-287 μm; spore reniform, spinose, hyaline, 47-52 μm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 15/07/13, *Nayan Thapa & Dorjay Lama*, 180A (SJCBH), 180B (LBH), N27°03'01.5'' and E088°23'52.5'', Alt: 1267 m ± 10.1.

Global distribution: Bhutan, China, India, Japan, Nepal, Taiwan.

Local Distribution: Mangwa, Takdah, Rungdung.

Katoella Fraser-Jenkins, Kandel & Pariyar, *Ferns and Fern-allies of Nepal I*: 33.2015.

Katoella pulchra (Don) Fraser-Jenkins, Kandel & Pariyar, *Ferns and Fern-allies of Nepal I*: 34.2015.

Davallia pulchra Don, *Prodr. Fl. Nepal.* 11. 1825;

Araiostegia pulchra (Don) Copeland, *Philipp. J. Sci.* 34: 241. 1927.

Plants epiphytic, pendent; rhizome wide, creeping, scaly; scales ovate, entire, apex acute, brown, 0.2-0.4 × 0.1-0.2 cm; fronds tri-pinnate, 15-30 × 6-12 cm; stipe stramineous, 4-7 cm, scaly; lamina coriaceous, dull green, lanceolate, acuminate, 11-23 × 6-12 cm; pinnae alternate, 10-15 pairs, stalked, elliptic-triangular, acute, 3-6 × 1.5-3 cm; pinnules alternate, 6-8 pairs, stalked, deeply lobed, oblong-ovate, acute, 1.5-2.1 × 0.6-1.1 cm; segments opposite, 2-3 pairs, lanceolate, entire, acute, 0.3 × 0.1 cm; veins distinct, simple; sori circular, singly in segment's, indusiate, brown; sporangium globose, dark brown, 250-260 μm; spore spherical to reniform, brown, smooth, 30-40 × 20-25 μm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 15/07/13, *Nayan Thapa & Dorjay Lama*, 179A (SJCBH), 179B (LBH), N27°03'01.5'' and E088°23'52.5'', Alt: 1267m ± 10.1.

Global distribution: Bhutan, China, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

Local distribution: Mangwa, Takdah.

Leucostegia C. Presl, *Tent. Pterid.* 94. 1836.

Leucostegia truncata (Don) Fraser-Jenkins, *Taxon. Revis. Indian Subcontin. Pterid.* 348.2008; Fraser-Jenkins, Kandel & Pariyar, *Ferns and Fern-allies of Nepal I*: 35.2015.

Leucostegia immersa Presl, *Tent. Pterid.* 95. 1836

Plants epiphytic, pendent; rhizome robust, long, creeping, scaly; scales lanceolate, entire, acuminate, light brown, 0.4-0.6 × 0.2-0.4 cm; fronds tripinnate, 30-60 × 10-16 cm; stipe 10-20, stramineous, glabrous; lamina deltoid, herbaceous, glabrous, green, 20-44 × 3.5-5 cm; pinnae alternate, 4-8 pairs, lanceolate, acuminate, basal pair largest, 16 × 5 cm; pinnules 3-5 pairs alternate, sub-sessile, ovate-lanceolate, 3.5 × 2 cm; ultimate segments /lobes rhomboid, base oblique, margin toothed with blunt apex; veins distinct, forked; sori half cup shaped, in ultimate segments, on acroscopic veinlet, Indusiate, yellowish; sporangium globose, brown, 155-170 μm; spore bilateral, oblong, tuberculated, yellow, 55-63 μm.

Exsiccatae : West Bengal, Darjiling hills, lebong, 18/07/11, *Nayan Thapa & Dorjay Lama*, 034A (SJCBH), 034B (LBH), N27°04'13.4'' and E088°16'59.5'', Alt: 1659m ± 11.5.

Global distribution: Bhutan, Cambodia, China, India, Indonesia, Malaysia, Myanmar, New Guinea, Philippines, Thailand.

Local distribution: Lebong, Third mile, Takdah

Polypodiaceae Bercht. & J. Presl, Delic. Prag. 159. 1822.

- 1. Frond simple , 3-60 × 1 – 9 cm.....2
- + Fronds pinnatifid to pinnate, 30-70 × 10-30 cm....7
- 2. Sori scattered abaxially on lamina.....3
- + Sori on either side of mid-vein.....5
- 3. Lamina 10-40 × 2-4 cm.....4
- + Lamina 20-70 × 3-8 cm.....**Microsorium**
- 4. Spore spherical to lunar, 35-70 × 20-50 μm**Pyrrhosia**
- + Spore bilateral, 25 × 15 μm.....**Tricholepidium**
- 5. Stipe 4-5 cm.....**Selliguea**
- + Stipe absent or 1-2 cm.....6
- 6. Sporangium 250-290 μm.....**Loxogramme**

- + . Sporangium 290-380µm.....**Lepisorus**
- 7. Pinnae 5-20 pairs.....8
- + . Pinnae absent lamina deeply pinnatifid.....10
- 8. Rhizome with whitish bloom.....**Arthromeris**
- + . Rhizome without whitish bloom.....9
- 9. Pinnae stalked..... **Phymatosorus**
- + . Pinnae sessile.....**Goniophlebium**
- 10. Fronds dimorphic.....**Drynaria**
- + . Fronds monomorphic.....11
- 11. Lobes 10-20 pairs.....**Polypodiodes**
- + . Lobes 3-5 pairs.....12
- 12. Stipe winged with laminar segments.....**Leptochilus**
- + . Stipe free without laminar segments.....**Pichisermollodes**

Arthromeris (T. Moore) J. Smith, Hist. Fil. 110. 1875

- 1. Sori scattered in many rows on either side of the costa.....2
- + Sori in one row on either side of the costa.....*Arthromeris wallichiana*
- 2 Fronds 40-60 cm, pinna 3-7 pairs.....*Arthromeris lehmannii*
- + Fronds 20-40 cm, pinna 1-3 pairs.....*Arthromeris himalayensis*

Arthromeris wallichiana (Spreng) Ching, Contrib. Inst. Bot. Natn. Acad. Peiping **2**: 92 .1933; Mehra & Bir , Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 173.1965; Dixit , A cen. of Indian Pterid.35. 1984; Thapa, Pterid. of Nepal 38.2002; Ghosh ,The Pter. Flo. Of East.Ind. I :575.2004; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 534.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium wallichianum Spreng, Linnaeus Syst. Veg. **4**: 53 .1927.

Polypodium juglandifolium Don, Prodr. Fl. Nepal.: 3 .1825.

Pleopeltis juglandifolia Moore, Ind. Fil.: 78 .1857.

Arthromeris wardii (Clarke) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) **4**: 94 .1933.

Polypodium wardii C.B. Clarke. J. Linn. Soc. (Lond.) Bot. **25**: 99, t.43 .1889.

Plants lithophytic to epiphytic; rhizome thick, creeping, scaly throughout; scales golden- brown, lanceolate, 0.1-0.15 × 0.2-0.3 cm; stipe stramineous, 15-30 × 0.2-0.4 cm, glabrous; lamina oblong, 30-50 × 15-25 cm; pinnae usually 6-12 pairs, sub-opposite, sessile, oblique, ovate-lanceolate, 5-12 × 3-5 cm, base obliquely cordate, margin entire, apex acuminate, glabrous; sori large, globose -orbicular, exindusiate, in one row on either side of costa; 1 on each side of costa, medial , solitary between lateral veins; sporangia globose, brown, 310-330 μm, spores brown, round, tuberculate, 27-35 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/11, *Nayan Thapa & Dorjay Lama*, 028A (SJCBH), 028B(LBH), N27°00'31.7'' and E088°17'37.4'', Alt :2154m ± 15

Global Distribution: Bhutan, China, India, Myanmar, Nepal, Vietnam,.

Local Distribution: Third mile, Sukhia, Takdah, Sonada, Lava, Algarah, Deer park.

Arthromeris lehmanni (Mettineus) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) 4: 96 . 1933; Mehra & Bir , Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 173.1965; Dixit , A cen. of Indian Pterid. 35 .1984; Thapa, Pterid. of Nepal 38.2002; Ghosh, The Pter. Flo. Of East. Ind. I: 577.2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I :442.2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 534.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium lehmanni Mettineus, Abh. Senck. Naturf. Ges. (Frankfurt) 2: 109 .1857.

Pleopeltis lehmanni (Mettineus) Beddome, Ferns Brit. India: t.260 .1868.

Arthromeris lungtauensis Ching, Bull. Fan Mem. Inst. Biol. (Bot.) 4: 98 .1933.

(Plate 3.14:G To I)

Plant epiphytic to lithophytic; rhizome long, creeping, scaly, covered with whitish bloom; scales brown at center, paler toward margin, 0.4-0.6 × 0.1-0.15 cm, margin minutely toothed, apex long caudate; stipe castaneous, shining, 10-20 × 0.2-0.4 cm, glabrous; rachis castaneous, glabrous; lamina imparipinnate, oblong-ovate in outline, 30-40 × 15-20 cm, green, both surfaces usually glabrous; pinnae usually 3-7 pairs, 7-12 × 1.5-2.7 cm, sub-opposite, sessile, slightly ascending, straight, lanceolate, base rounded, overlapping rachis, margin entire with cartilaginous membrane, ca. 0.15 cm, apex acuminate; terminal pinnae same as lateral pinnae; sori orbicular, exindusiate, irregularly distributed along veinlet, usually in 2-4 rows between costa and margin; sporangia globose, golden to brownish, 310-325 μm, spores spherical, golden brown, tuberculate, 23-26 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/11, *Nayan Thapa & Dorjay Lama*, 027A (SJCBH), 027B (LBH), N27°00'31.7'' and E088°17'37.4'', Alt : 2154 m ± 15

Global Distribution: Bhutan, India, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Local Distribution: Third mile, Ramam, Lava.

Arthromeris himalayensis (Hooker) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) **4**: 96.1933; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 173. 1965; Dixit, A Cen. of Indian Pterid. 35.1984; Thapa, Pterido. Of Nepal 38.2002; Ghosh, The Pter. Flo. Of East. Ind. I: 567.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 534.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium himalayense Hooker, Sp. Fil. **5**: 91.1863.

Pleopeltis himalayensis (Hooker) Beddome, Ferns Brit. India: t.318 .1869.

Plant epiphytic; rhizome long, creeping, with whitish bloom, scales ferruginous, linear-lanceolate, margin denticulate; Stipe distant, glabrous, dark stramineous, 8-18 × 0.2-0.6 cm; lamina oblong, 20-40 × 12-22 cm; pinnae 3-5 pairs, opposite, sessile, 6-9 × 2-3.5 cm, oblong lanceolate, acuminate, margin entire with whitish membrane, base rounded; sori large, rounded, exindusiate, scattered in many rows on either side of costa; sporangia globose, golden-brown, 250-287 μm, spore round, brown, minutely tuberculate, 33-35 μm.

Exsiccatae : West Bengal, Darjiling hills, Chatakpur, 1/10/11, *Nayan Thapa & Dorjay Lama, 070A (SJCBH), 070B (LBH)*, N27°00'43.2 and E088°17'30.2, Alt : 2253m ± 15.2

Global Distribution: Bhutan, India, Myanmar, Nepal, Vietnam.

Local Distribution: Chatakpur, Gorkhey, Alu bari, Deer parkely

Drynaria (Bory) J. Smith, J. Bot. (Hooker) **4**: 60. 1841 (*nom. cons.*).

1. Plants more than 50cm in height.....2

+ Plants less than 50 cm in height.....*Drynaria propinqua*

2. Plants pubescent, sori arranged singly between the two parallel veins of pinnae.....*Drynaria mollis*

+ . Plants glabrous, sori 3-5 in a single row between two parallel veins of pinnae*Drynaria coronans*

Drynaria propinqua (Wallich *ex* Mettinues) Smith, *apud* Beddome, Ferns Brit. India: t.160 .1866; Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 175.1964; Dixit, A Cen. Of Indian Pterid. 58.1984; Thapa, Pterid. of Nepal 41.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 456. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 535.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium propinquum Wallich *ex* Mettinues, Abh. Senck. Naturf. Ges. (Frankfurt) 2: 120, t.2, f.50 .1857.

Plant epiphytic to lithophytic, coriaceous; rhizome creeping, long ,thick, scaly; scales pale, appressed, 0.3-0.6 × 0.1-0.15cm, margin dentate; fronds dimorphic, sterile nest leaves 9-15× 7-10 cm, light brown, hard ,sessile, ovate, thin, pinnatilobed, lobes up to 8 pairs; Foliage leaves ,petiolated, ovate, lanceolate, green, 20-50 × 10-30 cm, pinnatifid; pinna oblong lanceolate, margins crenate to entire , base adnate, apex acute,7-12 × 1-3 cm; sori in single row between midrib and margin, exindusiate, sporangium globose, brown,268-310 μm, spore reniform, tuberculate, light brown, 36-40 × 23-25μm.

Exsiccatae : West Bengal,Darjiling hills, Lebong,20/05/13, *Nayan Thapa & Dorjay Lama, 122A (SJCBH), 122B(LBH), N27°04'13.5'' and E088° 16' 59.7''*,Alt :1550m ± 11.5

Global Distribution: Bhutan, India, Myanmar, Nepal, Thailand, Vietnam,China.

Local Distribution:Lebong, Rungdung,Toongsong,Ging,Dilaram,Payow.

Drynaria mollis Beddome,Ferns Brit. India:t.216.1867; Dixit, A Cen. Of Indian Pterid. 58.1984; Thapa , Pterid. of Nepal 41.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 535.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium rivale Mett.ex Bak.,Syn. Fil. ed.2:368. 1867.

Drynaria tibetica Ching & S.K.Wu, Fl. Xizangica 1:342.1983.

Plant epiphytic, yellowish green, rhizome long, creeping, scaly; scales basifixed, brownish, tufted; fronds dimorphic, sterile nest leaves hairy, sessile, , 7-15 × 3-7 cm, light brown, hard , base cordate, auriculate, pinnatilobed , lobes 8-13 pairs; foliage leaves stalked, stipe 1-10cm, winged; lamina pinnatifid , 20-50 × 7-15 cm, apex not aborted; pinnae 15-20 pairs, spreading, lanceolate, 3-8 × 1.5-2cm, margin entire, densely ciliate, apex acute, scales on abaxial side of costa, veins distinct; Sori in single row between costa and margin, globose, brownish; sporangium globose, golden , 310-330µm; spores reniform, light green, with spines.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 17/08/11, *Nayan Thapa & Dorjay Lama*, 053A (SJCBH), 053B(LBH), N27°03'01.25'' and E088°23'52'', Alt : 1267m ± 10.5

Global Distribution: Bhutan, India, Nepal, China.

Local Distribution: Mungpoo, Takdah, Mangwa.

Drynaria coronans Smith in J. Bot. 4:61.1841; Beddome, Handb. Ferns Brit. India, 341, t. 191.1883; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 535.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 35.2015.

Polypodium coronans Wallich, List n. 288.1828 (nomen nudum).

Pseudodrynaria coronans (Wallich) Ching in Sunyatesenia, 5, 357, 1940.

Aglaomorpha coronans Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 439.2005.

Plants epiphytic, hard, coriaceous, shining green, nest forming; rhizome thick, creeping, making thick bracket around host, covered by golden tomentose scales, basifixed, lanceolate, toothed, acuminate, 2-2.5 × 0.2-0.4 mm ; Fronds monomorphic, 100 -150 × 25-45 cm, elliptic to ob-lanceolate, base broad, dilated, basal portion represent the nest leaf, the upper portion is a normal fertile frond, pinnatifid, lobes oblong, entire, wavy, acuminate, 10-15 × 2-3 cm; sori brown , subglobose to elongated, 6-8, in single row between the

lateral veins, on either side of midrib; sporangium dark brown, globose, 170-180µm; spore reniform, hyaline, minutely spinous, 42-48µm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa & Dorjay Lama*, 128A (SJCBH), 128B(LBH), N27°04'40.2'' and E088°25'18.1'', Alt : 412m ± 11.5

Global Distribution: Bhutan, China, India, Hongkong, Malaya, Nepal, Thailand, Vietnam.

Local Distribution: Teesta, Samsing, Gourbathan, Melli, Singla.

Goniophlebium (Blume) C. Presl, Tent. Pterid. 185. 1836.

Goniophlebium argutum (Wallich *ex* Hooker) Smith in Hook, Gen. Fil.: t.51. 1840; Beddome, Handb. Ferns Brit. India (with Suppl.), 323, t.174. 1865; Thapa, Pterid. of Nepal 41.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 535.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I : 35.2015.

Polypodium argutum Wallich *ex* Hook, Sp. Fil. 5: 32, 1863.

Polypodiastrum argutum (Wallich *ex* Hooker) Ching, Acta Phytotax. Sin. 16 (4): 28, 1978.

Plants epiphytic to lithophytic, pendent; rhizome creeping, 0.3 -0.6 cm in diam., scaly; scales peltate, dark brown, ovate, ciliate at margin, acuminate, 0.6-0.8 × 0.2-0.3 cm; Frond monomorphic, 35-60 × 8-20; lamina, bi-pinnate, lanceolate, herbaceous, green abaxially and adaxially, 29-54 × 8-20 cm; stipe purplish, glabrous, 6-13 cm; pinna 8-18 pairs, linear-lanceolate, 7-14 × 1-3 cm, sessile, margin mucronate, acuminate; veins distinct, anastomosing, a linear row of costal areole, free forked marginal vein; sori on each costal areole, globose, brown, naked; sporangium globose, golden-brown, 260-280µm; spore monoletate, hyaline, smooth, globose, 45-50µm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 04/05/2011, *Nayan Thapa & Dorjay Lama*, 003A (SJCBH), 003B(LBH), N27°00'31.7'' and E088°17'37.5, Alt : 2154m ± 15.3

Global Distribution: Bhutan, NE India, Myanmar, Thailand, Nepal.

Local Distribution: Third mile, Chitrey, Lava, Chimney

Microsorium Link, Hort. Berol. 2: 110. 1833.

1. Fronds larger than 50 cm, sori scattered in the lamina.....2

+ Fronds smaller than 50 cm, sori arranged biserrately in the lamina.....*Microsorium zippelii*

2. Fronds membranaceous, dark green, veins distinct.....*Microsorium membranaceum*

+ Fronds leathery, Light green, veins indistinct.....*Microsorium punctatum*

Microsorium membranaceum (Don) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) **4**: 309 .1933; Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalaya 175.1964; Dixit, A Cen. Of Indian Pterid.46.1984; Thapa, Pterid. of Nepal 47.2002; Ghosh, The Pter. Flo. Of East.Ind. I: 558.2004; Fraser-Jenkins ,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 543.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

Polypodium membranaceum D.Don, Prodr. Fl. Nepal.: 2 .1825.

Polypodium hymenodes Kunze, Linnaea **23**: 279, 319 (1850), *non* Wallich [List no. 283 (1829), *nom. nud.*]

Colysis membranacea (D.Don) J.Sm., Catl. Cult. Ferns: 11 (1857), *non* C. Presl (1851).

Microsorium hymenodes (Kunze) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) **4**: 301 (1933).

Plant epiphytic to lithophytic, green in colour ,membranaceous; rhizome creeping, thick, 0.2-0.8 cm in diam., covered with brown scales; stipe 1-6 cm long, grooved ,winged; lamina simple,20-60 × 4.5-9 cm, decurrent at base, apex acute, margin entire; veins distinct, reticulate; sori in many rows

,scattered on undersurface, circular, small, exindusiate ; sporangium globose, golden brown,220-250µm;spore reniform, light brown,smooth,45-53 µm.

Exsiccatae : West Bengal,Darjiling hills, Third mile,15/07/11 *Nayan Thapa & Dorjay Lama*, 20A(SJCBH), 20B (LBH),N27°00'31.4''and E088°17'36.2'',Alt: 2153m±11.

Global Distribution: Bhutan, India, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

Local Distribution: Third mile, Lebong, Sonada,Tung, Dear park, Lava, Algarah, Payow.

Microsorium punctatum (Linnaeus) Copeland, Univ. Calif. Publ. Bot. **16**: 111 .1929; Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalaya 175.1964;Dixit, A Cen. Of Indian Pterid.47. 1984; Thapa , Pterid. of Nepal 4. 2002; Ghosh,The Pter. Flo. Of East. Ind. I: 562.2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh I: 481.2005; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 543.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

Acrostichum punctatum Linnaeus, Pl.: (1753).

Polypodium punctatum (Linnaeus) Swartz , Schrad. Bot. **1800** (2): 21 (1801)

Pleopeltis punctata Beddome, Suppl. Ferns South. India Brit. India: 22 .1876.

(Figure 3.6:A to C)

Plant epiphytic to lithophytic, subcoriaceous to coriaceous; rhizome wide creeping, sub-cylindrical, 0.4-0.8 cm in diam., scales 0.3 × 0.15 cm ,peltate, ovate-lanceolate, toothed, apex acute, dark brown; stipe small, winged ,3-4cm;lamina simple,30-70 × 10-15 cm, linear –lanceolate, glabrous, base decurrent, margin entire, apex acute to acuminate, veins indistinct; sori whitish, that turn brownish at maturity, globose, scattered in 2-6 irregular rows; sporangia globose, golden yellow,198-235µ,spore pale green, reniform to elliptic,smooth,48-64 ×40-42µm.

Exsiccatae:WestBengal,Darjilinghills,Teesta,07/08/2013,*NayanThapa*,193 A (SJCBH), 193B (LBH),N27°04'40.4''and E088°25'18.1'',Alt: 350m±11.

Global Distribution : India, Indonesia, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Teesta,Gourbathan,Jamuney,Singla,Kali Jhora.

Microsorium zippelii(Blume) Ching in Bull.Fan Mem. Inst.Biol.4: 308,1933 ; Holttum , Rev. Fl.Mal.2:176.1955; Mehra & Bir,Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 175.1964; Dixit ,A Cen. Of Indian Pterid. 47.1984; Ghosh ,The Pterid. Flo. Of East.Ind. I: 559.2004; Singh & Panigrahi ,Ferns and fern-allies of Arunachal Pradesh I: 483.2005; Fraser-Jenkins ,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 543.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

Polypodium zippelii Blume,Fl.Jav.Fil.172,t.80.1829.

Pleopeltis zippelii Moore, Ind. Fil.348.1862.

Polypodium heterocarpum Bedd. Ferns Brit. Ind. t.319.1870.

Polypodium heterocarpum var zippelii Hookeret Bak.Syn.Fil.ed.2:360.1874.

Plants epiphytic to lithophytic; rhizome creeping ,stout, 0.2-0.4cm in diam., scales dark brown,0.4-0.6 × 0.1-0.2 cm, ovate-lanceolate, acuminate; fronds simple, elliptic to lanceolate,20- 50 ×3-8 cm, base decurrent, lateral veins thick, prominent, with 4-7 row of aeroles; stipe 2-5 cm, articulated ,scales dark brown;sori in two row between the lateral veins,superficial, sporangium,globose,golden brown,220 -230µm,spores reniform,hyaline, 52 -60µm.

Exsiccatae: West Bengal, Darjiling hills, Lebong,date, *Nayan Thapa & Dorjay Lama,138 A (SJCBH), 138B(LBH), N27°04'13.5'' and E088°16'59.7''*,Alt :1550m ± 11.5

Global distribution: Malaya,India,Vietnam,Philippines,China.

Local Distribution: Lebong,Rungdung.

Lepisorus (J. Smith) Ching, Bull. Fan Mem. Inst. Biol. 4: 47. 1933.

1. Sori close to margin.....*Lepisorus loriformis*
- + Sori close to midrib.....2
2. Stipe more than 2 cm.....3
- + Stipe less than 2 cm.....*Lepisoru scolopendrium*
3. veins distinct and reaching to the margin.....4
- + Veins hidden.....*Lepisorus contortus*
4. Frond lanceolate, 30-40× 2-2.5 c.m.....*Lepisorus mehra*
- + Frond sickle shaped, 20-30 ×2-4 cm*Lepisorus sublinearis*

Lepisorus contortus (Christ) Ching, Bull.Fan Mem. Inst. Biol. (Bot.) 4: 90.1933; Dixit , A Cen. of Indian Pterid. 40 .1984; Thapa, Pterid. of Nepal 43.2002; Ghosh,The Pterid. Flo. Of East.Ind.I:517.2004; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 537.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 36.2015.

Polypodium lineare Thunb. var. *contortum* Christ, Nuov. Giorn. Bot. Soc. Ital. n.s. 4: 98 ,1897.

Polypodium conturtum (Christ) Christ, Bot. Gaz. (Chicago) 51: 347 ,1911.

Plants epiphytic;rhizome wide,creeping,Ca. 0.2 cm,scaly;scales laneolate, peltate, 0.4-1.9 × 0.1 cm,brown,acute; Fronds 12-29 × 1-1.7 cm, stipe 2-2.5 cm, straminaceous; lamina simple, green,linear to elliptic-lanceolate, attenuate, entire, rachis raised on abaxial side;veins hidden;sori median,on either side of the rachis, round;sporangia globose,brown,130-160µm,spore lunar to bilateral,hyaline,tuberculate, 40-42 × 32-26µm.

Exsciccatae : West Bengal,Darjiling hills, Third mile,04/05/11 *Nayan Thapa & Dorjay Lama*, 007A(SJCBH), 007B (LBH),N27°00'31.4''and E088°17'36.2'',Alt: 2153m±11.

General distribution: Bhutan,China,India,Nepal.

Local Distribution: Third mile, Senchel, Lava,Chimney

Lepisorus loriformis (Wallich *ex* Mett.) Ching, bull. Fan Mem. Inst. Biol. (Bot.) 4: 81 .1933; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 169.1965; Dixit , A Cen. of Indian Pterid. 41 ,1984; Thapa, Pterid. of Nepal 43.2002; Ghosh.The Pterid. Flo. Of East.Ind. I: 515.2004; Singh & Panigrahi,Ferns and fern-allies of Arunachal Pradesh II:510.2005 ;Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 537.2008; Fraser-Jenkin Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 36.2015.

Polypodium loriforme Wallich *ex* Mett. Abh. Senck. Naturf. Ges. (Frankfurt) 2: 92, 1857.

Pleopeltis loriformis (Wallich *ex* Mett.) Alston & Borner, Candollea 15: 208 ,1956.

Plants epiphytic;rhizome short,creeping,Ca. 0.3 cm in diamm.scaly;scales ovate-lanceolate,peltate,toothed,brown,0.2-0.4× 0.1 cm;frond simple, 20-70 × 1-1.9 cm; stipe palish green, 2-4cm;lamina green adaxially,glaucouscent adaxially,linear,sub-coriaceous,acuminate,18-64 ×1-1.9 cm; sori large, globose, brown, exindustae; sporangium globose,golden brown,300-320µm; spore, bilateral, hyaline, tuberculated, 34-36 × 24-28µm.

Exsciccatae : West Bengal,Darjiling hills, Kayakatta,20/07/11 *Nayan Thapa & Dorjay Lama*, 039A(SJCBH), 039B (LBH),N27°03'34.4''and E088°01'28.2'',Alt: 2818m±130.9.

Global Distribution: Bhutan,China,India,Myanmar,India.

Local distribution: kayakatta,Gayribas,Rachela.

Lepisorus mehrae Fras.- Jenkin New Sp. Syndrome .157-159.1997; Thapa. Pterid. of Nepal 43.2002; Fraser-Jenkins ,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 537.2008; Fraser-Jenk., Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 37.2015.

Lepisorus kashyapii (Mehra) Mehra in Bir, Res. Bull. Punjab Univ. n.s. **13**: 24.1962.

Lepisorus kashyapii (Mehra) Mehra in Bir var. *major* Bir & Tirkha, Amer. Fern J. **71** (2): 55 .1981.

Lepisorus kashyapii (Mehra) Mehra in Bir var. *minor* Bir & Tirkha, Amer. Fern J. **71**(2): 55 .1981.

Polypodium kashyapii Mehra, Punjab Univ. Publ.: 24 (1939), *nom. nud.*

(Figure 3.13:A to D)

Plants epiphytic; rhizome thick, creeping, Ca. 0.8 cm, scaly; scales 0.8-1 × 0.2-0.4 cm, lanceolate, acuminate, bicolours, brown; fronds simple, green, 30-37 × 1-3.5 cm; stipe light green, 2-2.5 cm; lamina linear-lanceolate, herbaceous, attenuated on both end; veins distinct, reticulate; sori large, globose, on either side of the rachis; sporangia globose, golden-brown, exindusate, 360-380 μm; spore monolet, hyaline, bilateral, tuberculate, 45-50 × 35-37 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 04/05/11 *Nayan Thapa & Dorjay Lama*, 04A(SJCBH), 04B (LBH), N27°00'31.4'' and E088°17'36.2'', Alt: 2153m±11.

Global distribution: Bhutan, China, India, Nepal, Thailand.

Local distribution: Senchel, Mungpoo, Singamari, lava.

Lepisorus scolopendrium (Buchanan-Hamilton ex Don) Mehra & Bir, Res. Bull. Panjab Univ. Sci. n.s. 15: 168. 1964; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 538.2008; Fraser-Jenk., Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 37.2015.

Polypodium scolopendrium Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 1,1825.

Pleopeltis scolopendrium(Don)Alston &Bonner in Candollea,15,207,1956.

Lepisorus excavates (Bory)Ching var.*scolopendrium*(Don)Ching in Bull.Fan.Mem.Inst.Biol.Bot.ser.4,69,1933.

Plants epiphytic,rhizome short,Ca.0.5 cm,scaly;scales bicolorous,dark brown at the center, pale-brown towards margin,lanceolate,toothed,acute,0.5-0.7 × 0.2-0.3 cm;frond simple,35-47 ×2-3 cm,stipec 0.5-1 cm,light green;lamina green ,rachis raised abaxially,elliptic-lanceolate,attenuate,acuminate,34-46 × 2-3 cm;sori globose, brown,exinidistae;sporangium spherical,golden brown, 290-300µm; spore bilateral,reniform,pale,tuberculate,60-65×40-42µm.

Exciccatae : West Bengal,Darjiling hills, Third mile,15/07/11 *Nayan Thapa & Dorjay Lama*, 21A(SJCBH), 21B (LBH),N27°00'31.4''and E 088° 17' 36.2'', Alt: 2153m±11.

Global distribution: Bhutan,China N India, Nepal,Taiwan.

Local Distribution: Third mile, Senchel,Chimney,Ghoom, Algarah

Lepisorus sublinearis (Baker ex Takeda) Ching, Bull.Fan Mem. Inst.Biol .4:78. 1933; Dixit , A Cen. of Indian Pterid. 43 .1984; Thapa, Pterid. of Nepal 45.2002; Ghosh,The Pterid. Flo. Of East.Ind. I: 526. 2004; Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 538.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 36.2015.

Polypodium sublineare Baker ex Takeda, Notes Roy.Bot. Gard. Edinb. 8:276.1915.

Plants epiphytic, sub coriaceous; rhizome creeping, wide,scaly;scales lanceolate,entire, acuminate, brown,0.4-0.8 × 0.1-0.2 cm; frond simple,20-30

×2-4 cm; stipe 1-3 cm, light green; lamina simple, broadly lanceolate, widest at basal half, entire, acuminate, 19-25 × 2-4 cm; sori globose, brown, exinductae; sporangium spherical, golden brown, 330-340 μm; spore bilateral, reniform, pale, tuberculate, 50-55 × 35-42 μm.

Exciccatae : West Bengal, Darjiling hills, Third mile, 01/10/11, *Nayan Thapa & Dorjay Lama*, 071A(SJCBH), 071B (LBH), N27°00'31.4'' and E088°17'37.5'', Alt: 2154m±15.

Global distribution: Bhutan, China, India, Nepal.

Local distribution: Third mile, Mungpoo.

Leptochilus Kaulf., Enum. Filic. 147. 1824.

1. Fronds monomorphic, , 30-70 × 4-30 cm..... 2
+. Fronds dimorphic , 30-50 × 5-10 cm *Leptochilus pedunculatus*
2. Lamina pinnatifid, 30-50 × 20-30 cm..... 3
+. Lamina simple, 10-80 × 4-8 cm..... *Leptochilus decurrens subsp. hemionitideus*.
3. Lamina segment 6-8 pairs..... *Leptochilus ellipticus*
+. Lamina segment 3-5 pairs..... *Leptochilus insignis*.

Leptochilus ellipticus (Thunberg) Nooteboom, Blumea. 42: 283. 1997; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 62.2008; Fraser-Jenkins, Kandel & Pariyar, Ferns and fern-allies of Nepal I:38 .2015

Polypodium ellipticum Thunberg, Fl. Jap.: 335. 1784.

Colysis elliptica (Thunberg) Ching in Bull. Fan Mem. Inst. Biol. Bot. 2:333. 1933.

Plants lithophytic, terrestrial, erect; rhizome long, creeping, scaly; scales ovate lanceolate, toothed, acuminate, brown, 0.6 × 0.3 cm; fronds

monomorphic, 40-60 × 20-30 cm; stipe stramineous, glabrous, 10-20 cm; lamina pinnatifid, deeply lobed, ovate, acuminate, 30-40 × 20-30 cm; rachis winged; lamina segment 6-8 pairs, opposite, lanceolate, entire, acuminate, 10-15 × 2.5-3.5 cm; veins distinct, anastomosing; sori coenosori, oblique, linear, between lateral veins, brown; sporangium ovoid to globose, dark brown, 345 × 310 μm; spore reniform, smooth, pale, 42 × 24 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 27/05/2013, *Nayan Thapa & Dorjay Lama, 136A (SJCBH), 136B (LBH), N27°01'46.0'' and E088°16'34.5, Alt : 1285m ± 18.3*

Global distribution: Bhutan, China, India, Japan, Korea, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Local distribution: Teesta, Rambi.

Leptochilus insignis (Blume) Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 62.2008; Fraser-Jenkins, Kandel, & Pariyar., Ferns and fern-allies of Nepal 1 :38. 2015.

Plants lithophytic, terrestrial, erect; rhizome short, creeping, scaly; scales lanceolate, toothed, acuminate, brown, 0.9 × 0.2 cm; fronds pinnatifid, monomorphic, 40-60 × 20-30 cm; stipe stramineous, winged, glabrous, 5-10 cm; lamina ovate – sub triangular, membranaceous, adaxially pubescent, 35-50 × 20-30 cm; rachis winged, 0.5-1 cm; laminar segment 3-5 pairs, opposite, ascending, oblong-lanceolate, entire, acuminate, 10-15 × 4-5 cm; veins prominent, distinct, reticulate; sori oblique, linear, exindusiate; sporangium ovoid, brown, 376 × 311 μm; spore spherical, tuberculate, pale, 45-50 μm.

Exsiccatae : West Bengal, Darjiling hills, Takdah, 10/07/13, *Nayan Thapa & Dorjay Lama, 149A (SJCBH), 149B (LBH), N27°02'01.4'' and E088°20'52.5'', Alt: 1865m ± 10.5.*

Global distribution: Bhutan, China, India, Japan.

Local distribution: Takdah, Kuresong.

Leptochilus pedunculatus (Hooker & Greville) Fraser-Jenkins, Taxon. Revis. Indian Subcontinental Pteridophytes 62. 2008; Fraser-Jenkins, Kandel, & Pariyar., Ferns and fern-allies of Nepal 1 :38. 2015.

Ceterach pedunculatum Hooker & Greville, Icon. Filic. 1: t. 5. 1827.

Colysis pedunculata (Hooker et Greville) Ching in Bull.Fan Mem. Inst. Biol. 4 : 321.1933

Plants lithophytic, terrestrial, erect; rhizome wide, creeping, scaly; scales ovate-lanceolate, margin toothed, acuminate, brown, 0.3-0.4× 0.1-0.2cm; frond dimorphic, distant, sterile frond simple, 30-50× 5-10 cm; stipe dark brown,scaly; 10-20 cm; sterile lamina ovate-oblong, entire, acuminate, 20-30× 5-10 cm;veins distinct, anastomosing forming costal aerole; fertile frond simple, 60-80× 4-5 cm; stipe dark brown, 50-60 cm;lamina ovate-lanceolate,entire, acuminate,10-20× 4-5 cm; sori elongated,linear ,oblique to the rachis,between the rows of lateral veins, brown; sporangium ovoid, dark brown, 367× 310µm; spore reniform, minutely spinous, pale-brown, 52× 28µm.

Exciccatae : West Bengal,Darjiling hills,Mangwa,10/07/13, *Nayan Thapa & Dorjay Lama, 154A(SJCBH), 154B (LBH),N27°03'01.4''*and *E088°23'52.5''*,Alt: 1267m±10.5.

Global distribution: China,India, Indonesia, Thailand, Vietnam.

Local distribution: Mangwa,Mungpoo

Leptochilus decurrens Blume subsp. **hemionitideus**Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 63.2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal 1 :37. 2015.

Colysis decurrens (Blume) Panigrahi, Abstr. & Souv. Nation. Symp. Curr. Trends. Pterid.1991:13.1991 (*comb .inval.*)

(Figure 3.15: A to D)

Plants lithophytic, terrestrial, erect; rhizome long, creeping, scaly; scales lanceolate, entire, acuminate, 0.4× 0.1 cm; fronds monomorphic, simple, 10-80× 4-8 cm; stipe 2-4 cm, winged; lamina oblong lanceolate, glabrous, papery, base cuneate, margin entire, apex acuminate; veins distinct, reticulate forming aroles; sori elongate to round, between lateral viens, brown; spore reniform, smooth, pale, 50× 28µm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 30/07/13, *Nayan Thapa & Dorjay Lama*, 186A (SJCBH), 186B (LBH), N27°02'00.4'' and E088°16'15.5'', Alt: 1846m±10.5.

Global distribution: Bhutan, India, Japan, Nepal, Thailand.

Local distribution: Rungdung.

Loxogramme (Blume) C. Presl, Tent. Pterid. 214-215, pl. 9, f. 8. 1836.

1. Plants less than 20 cm in height.....*Loxogramme chinensis*
- + Plant more than 20 cm in height.....2
2. The cell of the scale longer than its width.....*Loxogramme porcata*
- + The cells of the scale as long as its width.....*Loxogramme involuta*

Loxogramme involuta (D. Don) C. Presl, Tent. Pterid.: 215 .1836; Beddome, Ferns Brit. India ,393, f.228. 1883; Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 160.1964; Dixit, A Cen. Of Indian Pterid. 33.1984; Thapa, Pterid. of Nepal 46.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 541. 2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

Grammitis involuta D. Don, Prodr. Fl. Nepal.: 14 .1825.

Gymnogramme involuta (D. Don) Hooker, Sp. Fil.: 5: 155 .1864.

Loxogramme mussooriensis R.D. Dixit & S. Das, Indian Fern J. 11 (1-2):60 .1995.

Plant epiphytic, thick coriaceous, green; rhizome erect, short, scaly, scales ovate, brown with white –transparent hellow, 0.4 –0.6 × 0.1-0.2 cm,

acuminate; fronds in apical tuft, monomorphic; stipe indistinct, short; lamina simple, lanceolate, glabrous, attenuated at base, abaxially paler, adaxially deep green, 27-40 × 3-4 cm, apex caudate-acuminate, mid-vein raised abaxially, usually flat adaxially, straw-colored or pale green, veins hidden; sori linear, 3-4 × 0.1-0.2 cm, oblique, well spaced, between midvein to frond margin, superficial, exindusiate, sporangium globose, golden-brown, 250-265 μm, spore reniform, minutely tuberculate, light green, 40-45 μm.

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/2011, *Nayan Thapa & Dorjay Lama*, 018A (SJCBH), 018B(LBH), N27°00'30.5'' and E088°17'40.2'', Alt : 2130m ± 11.5

Global Distribution: India, Nepal, China, Thailand, Vietnam.

Local Distribution: Third mile, Toongsong, Singamari, Lava.

Loxogramme porcata Price, Amer. Fern J. **80** (1): 4-8 . 1990; Thapa, Pterid. of Nepal 47.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 541.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

(Figure 3.2: A to D)

Plant epiphytic, thick coriaceous, green; rhizome erect, short, scaly, scales ovate, brown, 0.6 – 0.8 × 0.1-0.3 cm, acuminate; fronds in apical tuft, monomorphic; stipe indistinct, short; lamina simple, lanceolate, glabrous, attenuated at base, abaxially paler, adaxially deep green, 30-50 × 3-6 cm, apex caudate-acuminate, midvein raised adaxially, usually flat abaxially, straw-colored or pale green, veins hidden; sori linear, 3-4.5 × 0.1-0.3 cm, oblique, well spaced, between mid-vein to frond margin, superficial, exindusiate; sporangium globose, brown, 270-280 μm, spore reniform to lunar, light green, minutely spinous, 43-47 μm.

Exsiccatae : West Bengal, Darjiling hills, Rohini, 03/04/2012, *Nayan Thapa & Dorjay Lama*, 107A (SJCBH), 107B(LBH), N26°54'10.5'' and E088° 20' 33.2'', Alt : 850m ± 11

Global Distribution: Bhutan, China, India, Myanmar, Nepal, N Thailand.

Local Distribution: Rohini, Pankhabari, Jamunay.

Loxogramme chinensis Ching in Sinensia, 1,13. 1829 ; Mehra & Bir, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 160.1964; Dixit, A Cen. Of Indian Pterid.33. 1984; Thapa , Pterid. Of Nepal 47.2002; Fraser-Jenkins ,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 541.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 39.2015.

Loxogramme lanceolata sensu Bedd.,Handb Ferns Brit.India,392.1833.

Plant epiphytic, coriaceous, dark green; rhizome creeping, 0. 1-0.2 cm in diam., densely scaly , scales pale brown , lanceolate, 0.5-0.7 × 0.1-0.2 cm, margin sub-entire; Fronds closely spaced , monomorphic; stipe short, pale green, narrowly winged; lamina simple,dark green, linear-lanceolate, 5-14× 0.5-2 cm, glabrous, base decurrent, margin slightly undulate , apex acute; costa raised on both surfaces, veins hidden; sori linear, oblique, subparallel to costa, superficial, exindusiate; sporangium globose, golden brown, 250-290µm; spore reniform to lunar, light green,spinous,35-40 µm.

Exciccatae : West Bengal,Darjiling hills, Toongsong,05/07/2011, *Nayan Thapa & Dorjay Lama, 013A (SJCBH), 013B(LBH), N27°54'2.5'' and E088°16'57.2''*,Alt :1623m ± 15.2

Global Distribution: Bhutan,China, India, Myanmar, Nepal, Thailand, Vietnam.

Local Distribution: Toongsong, Senchel,Chitrey,Lava.

Phymatosorus Pich.Sermolli, Webbia 28: 457. 1973.

Phymatosorus cuspidatus (Don) Pich.Sermolli subsp. **cuspidatus** Fraser-Jenkins ,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 529. 2008 ; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 40.2015.

Polypodium cuspidatum D.Don, Prodr. Fl. Nepal.: 2.1825.

Polypodium lucidum Roxb. in Griff., Calc. J. Nat. Hist. **4**: 486.1844.

Phymatodes cuspidata (D.Don) J.Sm., Catl. Cult. Ferns: 10 .1857.

Polypodium leiorhizum Wallich ex Mett., Fil. Hort. Lips.: 37, t.25, f.7 .1856.

Pleopeltis leiorhiza (Wallich ex Mett.) T.Moore, Ind. Fil.: 346.1862.

Microsorium lucidum (Roxb. in Griff.) Copel., Gen. Fil.: 196 .1947.

Microsorium cuspidatum (D.Don) Tagawa in Hara, Fl. East. Himal.: 495 .1966.

Phymatosorus lucidus (Roxb. in Griff.) Pich.Serm., Webbia **28**: 459 .1973.

Plants lithophytic, terrestrial, erect; rhizome thick, creeping, Ca.0.8 cm, scaly; scales bullet, broad, almost circular, adpressed, Ca. 0.6 cm; frond pinnate, 40-100 ×20-30 cm, shining green, coriaceous, glabrous; stipe articulated, glabrous, grooved dorsally, castanecous, 20-40 cm; lamina 50-70 × 20-30 cm; lateral pinnae 8-24 pairs, opposite, linear-lanceolate, stalked, 8-22 × 2.5-3.1 cm, entire, acuminate; veins distinct, anastomosing; sori globose, large, exindusiate; sporangium globose, golden-brown, 350-360 μm; spore bilateral, hyaline, reniform, smooth, 50-54 × 30-34 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 20/05/13, Nayan Thapa & Dorjay Lama, 120A(SJCBH), 120B (LBH), N27°02'00.4'' and E088°16'15.2'', Alt: 1846m ± 17.1.

Global Distribution: Bhutan, China, India, Nepal.

Local Distribution: Singla, Teesta, Peshok, Kalijhora

Pichisermollodes Fraser-Jenkins, Indian Fern J. 26(1-2): 122. 2010.

1. Plants less than 20 cm in height.....4
- +. Plants more than 20 cm in height.....2

2. Abaxial surface of pinna glaucous to white, pinna 6-8 × 2-3 cm.....3
- + . Abaxial surface of pinna light green, 4-12 × 1-2 cm...*Pichisermollodes stewartii*
3. Pinna broad, lanceolate, minutely serrated.....*Pichisermollodes ebenipis*
- + Pinna narrow, wavyly-crenate..... *Pichisermollodes crenatopinnata*
4. Lamina hairy, margins entire.....*Pichisermollodes erythrocarpa*
- + Lamina glabrous, margin with spines.....*Pichisermollodes malacodan*

Pichisermollodes ebenipis (Hooker) Fraser-Jenkin, Indian Fern J. 26(1-2): 122 .2009; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 40.2015.

Polypodium ebenipes Hooker, Sp. Fil. 5:88 .1863.

Pleopeltis ebenipes (Hooker) Bedd., Ferns Brit. India: t.138 .1866.

Phymatodes ebenipes (Hooker) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) 4: 86 .1933.

Crypsinus ebenipes (Hooker) Copel., Gen. Fil.: 206 .1947.

Crypsinus nepalensis Nakaike, Bull. Natn. Sci. Mus. (Bot.) Tokyo 13 (3): 89-105 .1978.

Selliguea ebenipes (Hooker) S. Lindsay, Edinburgh J. Bot. 66: 356. 2009.

Plants epiphytic to lithophytic, rhizome creeping, 0.3-0.5 cm in diam., scales dark brown, ovate-lanceolate, ca. 0.5cm, apex acute. Fronds monomorphic, 20-35 × 10-18 cm, palmatifid, deltate, adaxial surface green, abaxial surface

glaucous;Stipe 5-10 cm,scaly at base,purple ;rachis winged, lateral lobes 5-10 pairs,lanceolate,margins serrulate,apices acuminate basal pair deflexed;veins reticulate,prominent,Sori brown,orbicular, exindusiate,on either side of costa;Sporangium brownish,180-200µm;Spores greenish,lunar shaped,tuberculate,42-46×22-26µm.

Exciccatae : West Bengal,Darjiling hills,Third mile,22/09/2011, *Nayan Thapa & Dorjay Lama, 061A (SJCBH), 061B(LBH), N27°00'31.7'' and E088°17'37.4''*,Alt :2154m ± 15

Global Distribution:India,Nepal,Thailand,China

Local Distribution: Senchel,Lava,Chimney,Third Mile.

Pichisermollodes stewartii (Beddome) Fras-Jenkin, Indian Fern J. 26(1–2): 122 .2009; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 41.2015.

Pleopeltis stewartii Beddome, Ferns Brit. India: t.204 ,1867.

Polypodium stewartii (Beddome) C.B.Clarke, Trans. Linn.Soc.Lond. II Bot 1: 563 .1880.

Polypodium cyrtolobum J.Sm. ex C.B.Clarke; Trans. Linn. Soc. Lond. II Bot 1: 563, t.83 .1880.

Pleopeltis malacodon (Hooker) Beddome var *majus* (Hooker) Beddome, Handb Ferns Brit. India: 363 .1883.

Phymatodes stewartii (Beddome) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) 4: 81-87.1933.

Crypsinus stewartii (Beddome) Copeland, Gen. Fil.: 206 .1947.

Phymatopteris stewartii (Bedd.) Pich.Sermolli, Webbia 28: 464.1973 .

Plants epiphytic to lithophytic;Rhizome creeping,0.4 -0. in diamm.,covered with bloom of scales;Fronds monomorphic,17-28 ×10-16 cm ,pinnately parted;lateral lobes 10-15 × 1-3 cm,upwardly directed, adnate, serrulate, acuminate, veins reticualte, prominent, rachis winged;stipe 3-8 cm, articulated, glabrous;Sori globose,medial,on either side of rachis, brown,

exinduisate;Sporangium globose, golden-brown, 270-300 µm; Spores greenish,lunar shaped,spinose,45-50× 20-30µm.

Exsiccatae : West Bengal,Darjiling hills,Tonglu,05/08/2011, *Nayan Thapa & Dorjay Lama, 037A (SJCBH), 037B(LBH), N27°02'04.2''* and *E088°04'46.4''*,Alt :3050m ± 15

Global distribution:Bhutan,China,India,Nepal.

Local Distribution: Tonglu,Gayribas,Ramita.

Pichisermollodes crenato-pinnata (C.B. Clarke) Fraser-Jenkin, Indian Fern J. 26(1–2): 122 .2009.

Polypodium crenatopinnatum C. B. Clarke, J. Linn. Soc., Bot. 25: 99 t.42.1889.

Phymatopteris crenato-pinnata (Clarke)Pic.ser..Webbiba,28:461.1973.
(Plate 3.14:A to F)

Plants lithophytic,erect;rhizome ca. 0.2cm in diam., scaly; scales black - brownish, 15 cm;Stipe purplish, 5-10 cm, glabrous; lamina bipinnate,divided almost to midrib, deltoid-ovate in outline, 5-20 × 5-10 cm, base truncate; Lateral lobes 3-5pairs, 5-10 × 0.5-1.2 cm, base distinctly contracted, decurrent , margin irregularly incised or lobed, , apex acute ; Sori orbicular, medial ,brown,on either side of rachis;Sporangium globe,brown, 180-250µm;Spores lunar, light green,35-40 × 20-25µm,tuberculate.

Exsiccatae : West Bengal,Darjiling hills,Maneybhanj,05/08/2011, *Nayan Thapa & Dorjay Lama, 041A (SJCBH), 041B(LBH), N27°02'02.7''* and *E088°04'42.4''*, Alt :2154m ± 15

Global distribution: Bhutan,China,India,Nepal.

Local Distribution: Maneybhanj.

Pichisermollodes malacodon (Hooker) Fraser-Jenkin, Indian Fern J. 26(1–2): 122. 2009; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 40.2015.

Polypodium malacodon Hooker, Sp. Fil. 5: 87,1863.

Pleopeltis malacodon (Hooker) Beddome, Handb Ferns Brit. India : 363 .1883.

Phymatodes malacodon (Hooker) Ching, Bull. Fan Mem. Inst. Biol. (Bot.) **4**: 83 .1933.

Crypsinus malacodon (Hooker) Copeland, Gen. Fil.: 206 .1947.

Phymatopteris malacodon (Hooker) Pich.Sermolli, Webbia **28**: 463 .1973.

Phymatopsis cartilagineoserratus Ching & S.K.Wu in C.Y.Wu, Fl. Xizangica **1**:323 .1983.

Crypsinus cartilagineoserratus (Ching & S.K.Wu) Nakaike, Bull. Natn. Sci. Mus. (Bot.) Tokyo **13** (3).1987.

Selliguea malacodon (Hooker) S. G. Lu, Hovenkamp & M. G. Gilbert [comb. nov.]

Plants lithophytic,erect;rhizome ca. 0.2cm in diam., densely scaly; scales golden-brown, lanceolate, ca. 0.2cm, margin toothed, acuminate; Fronds monomorphic,10-15× 5-7 cm; stipe stramineous, 4-6 cm, glabrous; lamina pinnatisect, 8-12 × 4- 8 cm, base sub- cordate, margin serrulate, with sharply pointed teeth;Lateral lobes 1-3 pairs, lowest pair slightly deflexed, 4-6 × 1.5-2 cm, apex acute;veins distinct,reticulate;Sori orbicular,brown, medial ,on either side of costa;sporangium globose,brown,250-300µm;spore greenish, lunar,smooth,35-40× 20-25µm.

Exsciccatae : West Bengal,Darjiling hills,Sandhakphu,06/08/2011, *Nayan Thapa & Dorjay Lama, 044A (SJCBH), 044B(LBH), N27°07'41.2''* and *E087°59'29.4''*,Alt :3520m ± 11.8

Pichisermollodes erythrocarpa (Mettenius ex Kuhn) Fraser-Jenkins, Indian Fern J. 26(1-2): 122 ,2009; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 40.2015.

Polypodium erythrocarpum Mettenius ex Kuhn, Linnaea 36: 135. 1869.

Plants epiphytic to lithophytic, erect; Rhizome Ca.0.2cm in diam., covered with whitish bloom of scales; scales dark brown, lanceolate, ciliate, acuminate ; Fronds monomorphic,10-15×4-6cm; Stipe stminaceous, 2-6 cm, pubescent; Lamina green, pinnate , 6--9 × 4-6 cm, cordate at base;Pinna 4-6 pairs, lanceolate, 3-4.5 × 0.8-1.5 cm, , margin crenate-serrate , ciliate, apex acute; lateral veins distinct,; Sori orbicular, close to costa,on either side of costa,brown;Sporangium golden-brown,globose,240-260µm;spore greenish, lunar,spinose,35-40 × 25-28µm.

Exsiccatae : West Bengal,Darjiling hills,Sandhakphu,02/09/2013, *Nayan Thapa & Dorjay Lama, 194A (SJCBH), 194B(LBH), N27°07'41.2'' and E087°59'29.4''*,Alt :3520m ± 11.8

Global distribution:Bhutan,China,Indai,Nepal

Local Distribution: Phalut,Sabargram,Sandhakphu.

Polypodiodes Ching, Acta Phytotax. Sin. 16(4): 26. 1978.

- 1. Plant 40-65 × 8-25 cm, pinnae incised or serrated2
- + Plant 20-50 × 10-20 cm, pinnae densely double serrate3
- 2. Scales brown, segments 1.5-2 cm wide..... *Polypodiodes amonea*
- + Scales black, segment 0.5-1cm wide..... *Polypodiodes lachnopus*
- 3. Scales brown,denticulate,0.6-0.8 × 0.2-0.4 cm.....*Polypodiodes hendersonii*
- + Scales black, entire, 0.7-1 cm × 0.5- 0.8 cm.....*Polypodiodes subamonea*

Polypodiodes amoena (Wallich *ex* Mettenius) Ching, Acta Phytotax. Sin. **16** (4): 27 .1978; Dixit, A Cen. Of Ind. Pterid.51.1984; Thapa, Pterid.of Nepal 52.2002; Ghosh,The Pter. Flo. Of East.Ind. I: 590.2004 Fraser-Jenkins,Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen.

List 545.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 41.2015.

Goniophlebium amoenum (Wallich ex Mettenius) Bedd., Ferns Brit. India: t.5 .1865.

Polypodium amoenum Wallich ex Mett., Abh. Senck. Naturf. Ges. (Frankfurt) **2**: 80 .1857.

Polypodium amoenum Wallich ex Mett. forma *pilosum* C.B.Clarke, Trans. Linn. Soc. Lond. II Bot **1**: 417 .1880.

Plants epiphytic to lithophytic, rhizome creeping, 0.5-0.7 cm in diam., scaly; scales dark-brown, ovate-lanceolate, 0.6 × 0.6 cm, acuminate, denticulate; frond pinnate, 40-65 × 20-25 cm, ovate-lanceolate, thick; stipe castaneous, 10-20 cm; pinna or segment, 20-30 pairs, oblong lanceolate, 10-13 × 1.5-2 cm, margins serrated, acuminate, basal pair deflexed; veins distinct, unisertae areoles along costa; sori round, brown on either side of costa, along the areoles; sporangium globose, golden-brown, 260-280 μm, paraphysis stalked, umbrella shaped, brown; spore light brown, monolet, smooth, reniform, 50-55 × 24-30 μm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 28/07/13, *Nayan Thapa & Dorjay Lama*, 185A (SJCBH), 185B (LBH), N27°04'13.4'' and E088°16'59.2'', Alt: 1659m ± 11.1.

Global distribution: Bhutan, China, India, Nepal, Myanmar, Thailand, Taiwan.

Local distribution: Lebong, Singamari

Polypodiodes hendersonii (Beddome) Fraser-Jenkins, New Sp. Syndr. Indian Pteridol. 202. 1997; Thapa, Pterid. of Nepal 53.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen.

List 545.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 42.2015.

Goniophlebium hendersonii Bedd., Suppl. Ferns South. India Brit. India: 21, t.384.1876.

Polypodiodes atkinsonii (C.Chr.) Ching, Acta Phytotax. Sin **16** (4): 27 .1978.

Plants epiphytic to lithophytic; rhizome creeping, Ca.0.4-0.6 cm in diam., scaly; scales linear lanceolate, black, dented, acuminate; fronds pinnate, papery, remote on rhizome, 20-35 × 10-15 cm; stipe stramineous, 8-10 cm; lateral pinnae 20-25 pairs, 5-8 × 1-1.5 cm, lobes ascending, lanceolate, serrate, acuminate, lowest segment deflexed; veins distinct, forming a linear costal aerole, along the costa; sori round, brown, each in costal aerole along either side of costa; sporangium golden-brown, globose, 350-370 μm, spore bilateral, monolet, hyaline, smooth, 35-40 × 26-30 μm.

Exsiccatae : West Bengal, Darjiling hills, Jalapahar, 27/05/13, *Nayan Thapa & Dorjay Lama*, 134A(SJCBH), 134B (LBH), N27°00'25.2'' and E088°16'27.2'', Alt: 2235m±11.1.

Global Distribution: China, India, Nepal.

Local Distribution: Jalapahar, Garg world, Chaudafera.

Polypodiodes lachnopus (Wallich *ex* Hooker) Ching, Acta Phytotax. Sin. **16** (40): 27 .1978; Dixit, A Cen. Of Indian Pterid. 52.1984; Thapa, Pterid. of Nepal 53.2002; Ghosh, The Pter. Flo. Of East. Ind. I: 589.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 543.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 43.2015.

Goniophlebium lachnopus (Wallich *ex* Hooker) Bedd., Handb. Ferns Brit. India: 319 .1833.

Polypodium lachnopus Wallich *ex* Hooker, Ic. Pl.: t.592 .1854.

Polypodium lachnopus Wallich *ex* Hooker, Hooker's Icon. Pl. t. 952.1854.

(Plate 3.20: A to F)

Plants epiphytic to lithophytic; rhizome long, creeping, Ca. 0.5 cm in diam., scaly; scales black, ovate-lanceolate, margin ciliated, acuminate; fronds pinnate, lanceolate, papery, 35-60 × 20-25 cm; stipe stramineous, 5-9 cm; pinna lobes lanceolate, 35-40 pairs, 3-7 × 0.5-1 cm, lanceolate, margin serrated, acute, lobes ascending, basal two pairs deflexed, short; veins distinct, forming a single row of costal aerole; sori orbicular, brown, each included within costal aerole; sporangium brown, globular, 200-240 μm; spore hyaline, lunar, smooth, 35-38 × 28-30 μm.

Exsiccatae : West Bengal, Darjiling hills, Singamari, 13/09/13, *Nayan Thapa & Dorjay Lama*, 196A (SJCBH), 196B (LBH), N27° 1.02' 2.3'' and E088° 15' 1.2'', Alt: 1969 m ± 12.1.

Global Distribution: Bhutan, China, India, Nepal.

Local Distribution: Singamari, third mile, sonada.

Polypodiodes subamoena (Clarke) Ching, Acta Phytotax. Sin. **16** (4): 27. 1978; Dixit, A Cen. Of Indian Pterid. 52. 1984; Thapa, Pterid. of Nepal 54. 2002; Ghosh, The Pteridophytic Flo. Of East. Ind. I: 591. 2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 543. 2008.

Goniophlebium subamoenum (Clarke) Bedd., Handb. Ferns Brit. India: 317. 1883.

Polypodium subamoenum Clarke, Trans. Linn. Soc. Lond. II Bot. **1**: 550, t. 82, f. 2. 1880.

Plants epiphytic to lithophytic; rhizome creeping, wide, scaly; scales brown, subulate, clathrate, denticulate, acuminate, 0.7-1 × 0.5-0.8 cm; fronds monomorphic, papery, lanceolate, remote on rhizome, 20-50 × 10-20 cm; stipe stramineous, 8-15 cm; pinnae lobes 10-20 pairs, lanceolate, 5-10 × 1.5-2.5 cm, acuminate, margin double serrate, ascending, basal two pairs short, deflexed; veins distinct, forming a serial row of costal aerole; sorus

orbicular, brown; each inside a costal areole; sporangia elliptic-elongated, brown, 230-240×80-90µm; spore light green, smooth, bilateral-lunar shaped, monolete, 33-40 × 26-28µm.

Exsiccatae : West Bengal, Darjiling hills, Singamari, 13/09/13, *Nayan Thapa & Dorjay Lama*, 197A(SJCBH), 197B (LBH), N27°1.02'2.3'' and E088°15' 1.2'', Alt: 1969m ±12.1.

Global Distribution: Bhutan, China, India, Nepal.

Local Distribution: Sinagmari, lava, Chimney

Pyrrrosia Mirbel, Hist. Nat. Vég. (Lam. & Mirbel) 3: 471; 5: 91. 1802

1. Plants less than 10 cm in height.....*Pyrrrosia lanceolata*
- + Plants more than 20 cm in height.....2
2. Stipe length more than 5 cm.....3
- + Stipe length less than 3cm.....4
3. Lamina lanceolate, 10-20 cm *Pyrrrosia nuda*
- + Lamina ovate to oblong5
4. Lamina ovate, 15-30 × 6-10 cm..... *Pyrrrosia lingua*
- + Lamina oblong, 30-50 × 6-12 cm..... *Pyrrrosia costata*
5. Rhizome short, decumbent, 2-3 cm..... *Pyrrrosia mannii*
- + Rhizome long creeping, 6-10 cm..... *Pyrrrosia porosa*

Pyrrrosia costata (C.Presl ex Beddome) Tagawa & K.Iwats, Acta Phytotax. Geobot. Kyoto 22:100.1967; Dixit, A Cen. of Indian Pterid. 53, 1984 Thapa, Pterid. of Nepal 54.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 463.2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II: 539.2005

;Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 546. 2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I :42 2015.

Niphobolus costatus C.Presl ex Bedd, Ferns Brit. India: t.120, 1868.

Niphobolus beddomeana Giesenh, Farng. Niphobolus: 101, 1901.

Pyrrosia beddomeana (Giesenh) Ching, Bull. Chin. Bot. Soc. 1:68, 1935.

Plants lithophytic to epiphytic; rhizome short, creeping, Ca. 0.4 cm in diam., scaly; scales basifixed, entire, lanceolate, brown, acuminate, 0.5-0.8 × 0.2-0.4 cm; Fronds monomorphic, 18-62 × 5-8 cm, oblong-lanceolate; lamina green, glabrous adaxially, dimorphic hairs abaxially, decurrent, apex caudate; stipe 1-4 c.m, winged, scaly; sori circular, brown, intermingled with stellate hairs; sporangium globose, brown, 220-230 μm; spore bilateral to lunar shaped, grayish-yellow, smooth, 60-63 × 42-46 μm.

Exsiccatae : West Bengal, Darjiling hills, Rungdung, 27/05/2013, *Nayan Thapa & Dorjay Lama, 141A (SJCBH), 141B(LBH), N27°01'16.0'' and E088°16'24.5, Alt :1585m ± 18.3*

Global Distribution: Bhutan, China, India, Myanmar, Nepal, Thailand, Vietnam.

Local Distribution: Rungdung, Barnesbeg, Peshok, Makaibari

Pyrrosia lingua (Thunberg) Farwell, Amer. Midl. Naturalist. 12: 302. 1931; Ching, Bull. Chinese Bot. Soc. 1:60. 1935; Dixit, A Cen. of Indian Pterid. 54. 1984; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II:540. 2005; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 546. 2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I :42 2015.

Acrostichum lingua Thunberg Syst. Veg, ed. 14, 928. 1784.

Niphobolus lingua Giesenh Niphobolus 156, 1901.

Plants lithophytic to epiphytic; Rhizome wide creeping, 0.3-0.5 cm in diam., scaly; scales brown, lanceolate, entire, acuminate, 0.6-0.8 × Ca. 0.2 cm; Fronds mono-morphic, 10-30 × 3-6 c.m; lamina simple, elliptic, green adaxially, abaxially with stellate hairs, 6-23 × 3-6 c.m; stipe stramineous, 4-7 c.m; sori globose, compact, covered by lobose, golden-brown, 200-220 μm; spore reniform, greenish, tuberculated, 65 × 44 μm.

Exsiccatae : West Bengal,Darjiling hills,Pandam,22/09/2011, *Nayan Thapa & Dorjay Lama,054A(SJCBH),054B(LBH)*, N27°03'31.7''and E088° 16' 30.2.4'', Alt :1720m ± 15.2

Global Distribution: China, India, Japan, Korea, Myanmar, Vietnam .

Local Distribution: Pandam,Lebong, Takdah.

Pyrrosia lanceolata (Linnaeus) Farwell, Amer. Midl. Nat. **12**: 245 ,1931; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 161.1965; Dixit, A Cen. Of Indian Pterid 54.1984; Thapa, Pterid. of Nepal 54.20 02; Ghosh, The Pterid. Flo. Of East. Ind. I: 463.2004; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II:539.2005 ; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 547.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I :42. 2015.

Acrostichum lanceolatum L, Sp. Pl, **2**, 1067.1753.

Polypodium adnascens Sw, Syn. Fil.: 25, 222 .1806.

Niphobolus adnascens (Sw.) Kaulf, Enum. Fil.: 124 .1824.

Pyrrosia adnascens (Sw.) Ching, Bull. Chin. Bot. Soc. **1**, 45 .1935.

Plants epiphytic to lithophytic; Rhizome thin, long creeping, Ca.0.2 c.m in diam, sclay; scales brown, lanceolate, acuminate, ciliate ,0.3-0.7 × 0.1-0.2 cm; Fronds monomorphic, ,5-12 × 0.4-1.2 cm; lamina simple, green adaxially , abaxially with stellate hairs , 6-13 × 0.4-1.2 cm, base attenuate, decurrent, obtuse; Sori sunken, covered with stellate hairs; Sporangia globose, dark brown, 200-245 µm; spore greenish, lunar, spinose, 35-45 × 24-27 µm.

Exsiccatae : West Bengal,Darjiling hills,Teesta,23/05/13, *Nayan Thapa & Dorjay Lama, 054A (SJCBH), 054B(LBH)*, N27°04'40.2'' and E088°16' 25.18.1'', Alt :649m ± 14.2

Global Distribution: Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam.

Local distribution: Peshok, Teesta, Singla, Sukuna.

Pyrrosia mannii (Giesenh) Ching, Bull. Chin. Bot. Soc. **1**: 55 (1935); Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 163.1965; Dixit, A Cen. Of Indian Pterid. 55.1984; Thapa, Pterid. of Nepal 55.2002; Ghosh, The Pterid. Flo. Of East. Ind. I : 467.2004; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 547.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I : 42. 2015.

Niphobolus mannii Giesenh, Farngr. Niphobolus: 107, 1901.

Niphobolus fissus sensu Beddome: 330 f. 179 (1883), *p.p.*, non Bl.

Polypodium fissum sensu Clarke: 554 (1880); Hope: 88 (1903), non Bak., 1867.

Niphobolus mannii Giesenhagen, Niphobolus, 107. 1901.

(Figure 3.8: A to D)

Plants epiphytic, pendent; Rhizome short, decumbent; 0.2-0.4 cm in diam, scaly; scales lanceolate, brown, acuminate; Fronds monomorphic, 10-30 × 1.5-3 cm; lamina simple, lanceolate, green, adaxially with stellate hairs, brown abaxially with stellate hairs; Sori superficial, round, red; sporangium globose, brown, 180-240 μm; spore lunar, light brown, lunar to ovoid, 65-70 × 46-50 μm.

Exsiccatae : West Bengal, Darjiling hills, Lebong, 27/05/13, Nayan Thapa & Dorjay Lama, 137A (SJCBH), 137B (LBH), N27°04'13.5'' and E088°16'25.1'59.7'', Alt : 1649m ± 14.2

Global Distribution: Bhutan, India, Myanmar, Nepal, Thailand

Local Distribution: Rungdung, Takdah, Lebong.

Pyrrosia nuda (Giesenh) Ching, Bull. Chin. Bot. Soc. **1**: 70. 1935; Mehra & Bir, Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 162.1965; Dixit, A Cen. Of Indian Pterid. 55.1984; Thapa, Pterid. of Nepal 55.2002; Ghosh, The Pterid. Flo. Of East. Ind. I: 461.2004; Fraser-Jenkins, Tax. Revi.

Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 547.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I : 42.2015.

Niphobolus nudus Giesenh, Farngr. Niphobolus: 149 .1901.

Plants epiphyte to lithophytics; rhizome long creeping, 0.1-0.3 cm in diam., scaly; scales brown, lanceolate, acuminate; fronds monomorphic, 10-30 × 1.8-2.5 cm; lamina simple, adaxially green, abaxially with minute stellate hairs, 3-25 × 1.8-2.5 cm; stipe pale-green, 1-5 cm; Sori dark brown, globose, 300-310 μm; spore spherical, smooth, pale, 30-40 μm.

Exsiccatae : West Bengal, Darjiling hills, Teesta, 23/05/13, *Nayan Thapa & Dorjay Lama*, 133A (SJCBH), 133 (LBH), N27°04'40.2'' and E088°16' 25.1' 8.1'', Alt : 649m ± 14.2

Global Distribution: Bhutan, N India, Myanmar, Nepal .

Local distribution: Peshok view Point, Teesta, Kalijhora, Sukuna.

Pyrrhosia porosa (Presl) Hovenkamp, Blumea **30**: 208 .1984; Thapa, Pterid. of Nepal 55.2002; Singh & Panigrahi, Ferns and fern-allies of Arunachal Pradesh II: 547.2005 Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 547.2008; Fraser-Jenkins, Kandel, & Pariyar, Ferns and fern-allies of Nepal I : 42.2015.

Niphobolus porosus C. Presl, Tent. Pterid.: 202 .1836.

Niphobolus mollis Kunze, Bot. Zeit. **6**: 121.1848.

Pyrrhosia mollis (Kunze) Ching, Bull. Chin. Bot. Soc. **1**: 53 .1935.

Pyrrhosia penengiana (Hooker) Holttum, Rev. Fl. Mal. **2**: 146, f.62 ,1955.

Pyrrhosia stictica (Kunze) Holttum, Novit. Bot. **1968**: 30 ,1969.

Plants epiphytic to lithophytic, pendent; rhizome lanceolate, thin, long, creeping, Ca. 0.1-0.3 cm in diam., scaly; scales, lanceolate, smooth, 0.1-0.6 × 0.1-0.2 cm, base entire, acuminate; Frond monomorphic, 10-25 × 1.5-2.7 cm; lamina simple, linear, decurrent, adaxially green, glabrous, abaxially with monomorphic stellate hair; stipe winged; sori globose with stellate hair,

brown, exindusiate; sporangium brown, globose, 210-230µm, spore spherical, smooth, green, 50-60µm.

Exsiccatae : West Bengal, Darjiling hills, Mangwa, 10/09/13, *Nayan Thapa & Dorjay Lama, 195A (SJCBH), 195(LBH)*, N27°03'01.1'' and E088°16'23'52.0'', Alt : 1267m ± 10.5

Global Distribution: Bhutan, India, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam.

Local Distribution: Mangwa, Takdah, Mungpoo, Kalimpong.

Selliguea Bory, Dict. Class. Hist. Nat. 6: 587. 1824.

Selliguea griffithiana (Hooker) Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a rev. Cen. List 47.2008; Fraser-Jenkin, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 43.2015.

Polypodium griffithianum Hooker, Hooker's Icon. Pl. 10: t. 951. 1854,

Phmatodes griffithiana (Hooker) Ching in Contrib. Inst. Bot. nat. Acad. Peiping 2, 71. 1933; ; Mehra, Pteridophytic Fl. of Darjeeling and Sikkim Himalayas 170. 1964.

Phymatopteris griffithiana (Hook) Pich. Serm., Webbia 28: 462, 1973; Thapa, Pterid. Of Nepal 50. 2002.

(Plate 3.9: A to D)

Plants lithophytic to epiphytic, rhizome long, creeping, 0.3-0.4 cm in diam., densely scaly, scales dark brown, lanceolate, margin entire, apex acuminate; Fronds monomorphic; stipe stramineous, 4-10 cm; lamina simple, green, ovate-lanceolate, 5-23 × 3-6 cm, margin entire, cartilaginous, glabrous, cuneate at base, apex acute to acuminate; veins distinct, reticulate; sori globose, brown, large, in single row between midrib and margin, exindusiate; sporangium dark brown, globose, 300-320µm; spores brown, reniform, minutely spinous, 40 × 25µm..

Exsiccatae : West Bengal, Darjiling hills, Third mile, 15/07/11, *Nayan Thapa 019A (SJCBH), 019B(LBH)*, N27°00'31.2'' and E088°17'37.4'', Alt : 2154m ± 11.5

Global Distribution: Bhutan,China, India, Myanmar, Nepal, Thailand, Vietnam.

Local Distribution: Third mile,Chatakpur,Kafer,Chimney.

Tricholepidium Ching, Acta Phytotax. Geobot. 29: 41. 1978.

Tricholepidium normale (Don) Ching, Acta Phytotax. Geobot. 29: 43. 1978; Mehra & Bir ,Pteridophytic Fl. Of Darjeeling and Sikkim Himalayas 118.1965; Dixit , A Cens. of Indian Pterid.98.1984; Thapa, Pterid. of Nepal 83.2002; Fraser-Jenkins, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 562. 2008; Fraser-Jenkins, Kandel & Pariyar,Ferns and fern-allies of Nepal I:185.2015.

Polypodium normale Don, Prodr. Fl. Nepal. 1. 1825.

(Plate 3.11:A to E)

Plants epiphytic, pendent; rhizome long, creeping, scaly; scales lanceolate, bristle at base, entire, acuminate, 0.8× 0.2 cm; fronds simple, monomorphic, 10-40× 2-4 cm, sessile; lamina lanceolate, margin undulate, acuminate, herbaceous, green, abaxially scaly, 10-24× 2-4 cm; veins distinct, anastomosing, aeroles 2-5 on either side of midrib; sori scattered, superficial, spherical, exindusiate, whitish –brownish ; sporangium ovoid, dark brown, 300× 250µm; spore bilateral, smooth, green, 25× 15µm.

Exsiccatae : West Bengal,Darjiling hills,Third mile,30/06/13, *Nayan Thapa & Dorjay Lama,143A(SJCBH),143B(LBH),N27°00'31.2''* and *E088°17'37.4''*,Alt :2154m ± 11.5

Global distribution: Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, Thailand, Vietnam.

Local distribution: Third mile, lebong, lava

Grammitidaceae Newman, Hist. Brit. Ferns 7. 1840.

Tomophyllum (E. Fourn.) Parris, Gard. Bull. Singapore 58(2): 245. 2007.

Tomophyllum donianum (Sprengel) Fraser-Jenkins & Parris, Tax. Revi. Of Three Hundred Ind. Subcon. Pterid. With a revi. Cen. List 75.636; Fraser-Jenkins, Kandel & Pariyar, Ferns and Fern-allies of Nepal I: 43.2015. (Plate:3.5)

Polypodium donianum Sprengel, Syst. Veg. 4: 54. 1827.

Plant epiphytic, rhizome short, erect, hairy; hairs reddish-brown, simple, Ca. 0.1 cm in diam.; fronds uni-pinnate, hairy, green, 7-16 × 1-2 cm; stipe glabrous upto 1 cm; lamina 6-15 × 1-2 cm, oblong-lanceolate, hairy on adaxial and abaxial side; segments or lobes adnate, oblique, margin irregularly lobed, obtuse, 1 × 0.5 cm; sori round, brown, exindusiate; sporangium globose, golden-brown, 300-310 μm; spore tetrahedral, smooth, 35-40 μm.

Exsiccatae : West Bengal, Darjiling hills, Gayribas, 25/10/11, *Nayan Thapa & Dorjay Lama*, 086A(SJCBH), 086B(LBH), N27°03'33.5'' and E088°01'27.9'', Alt: 2532m ± 12.8.

Global distribution: Bhutan, China, India, Nepal.

Local Distribution: Gayribas, Sanchel

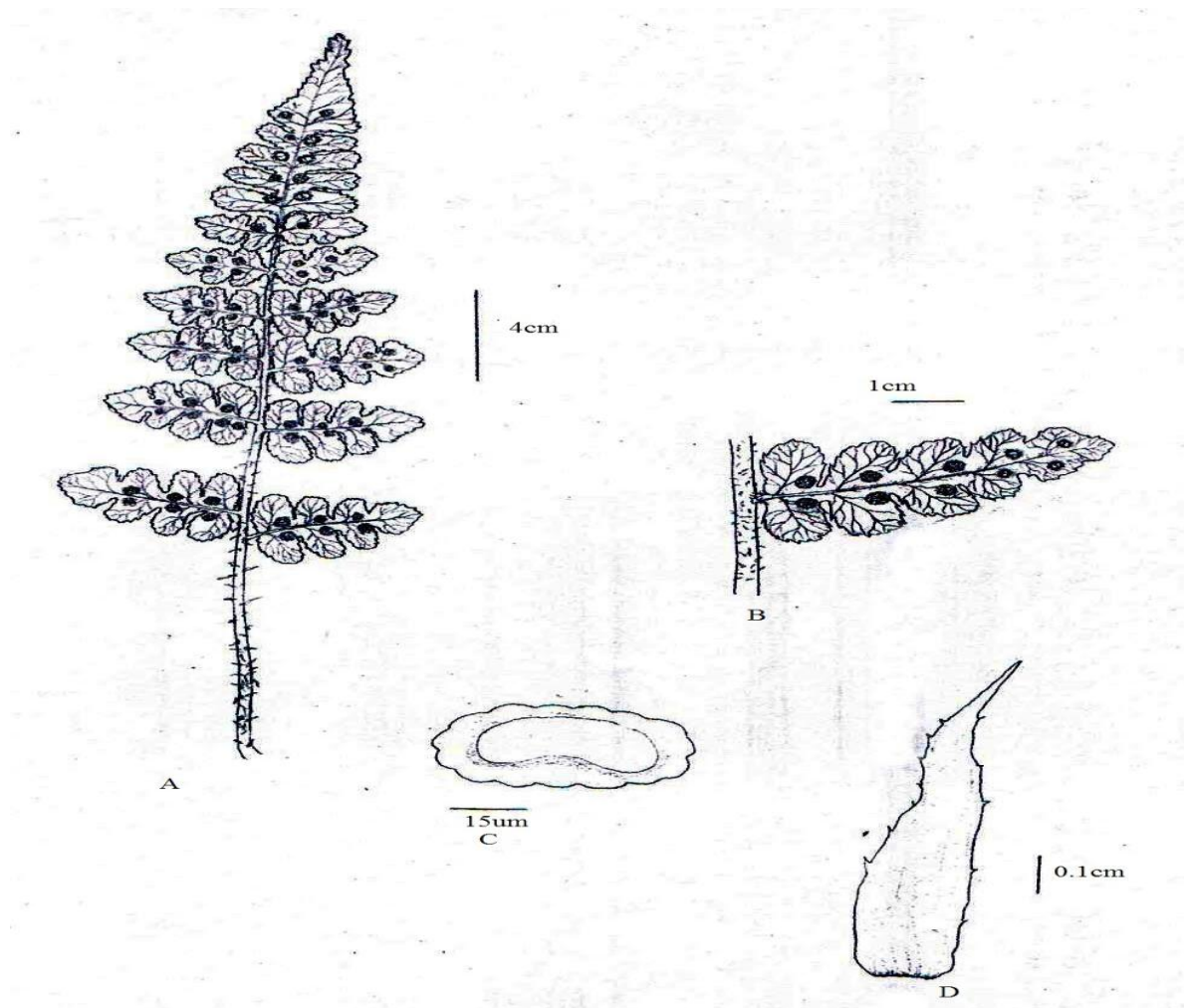


Figure 3.1: A. *Dryopteris serratodentata* Beddome ; B. Pinnae; C. Spores 400x; D. Rhizome scales.

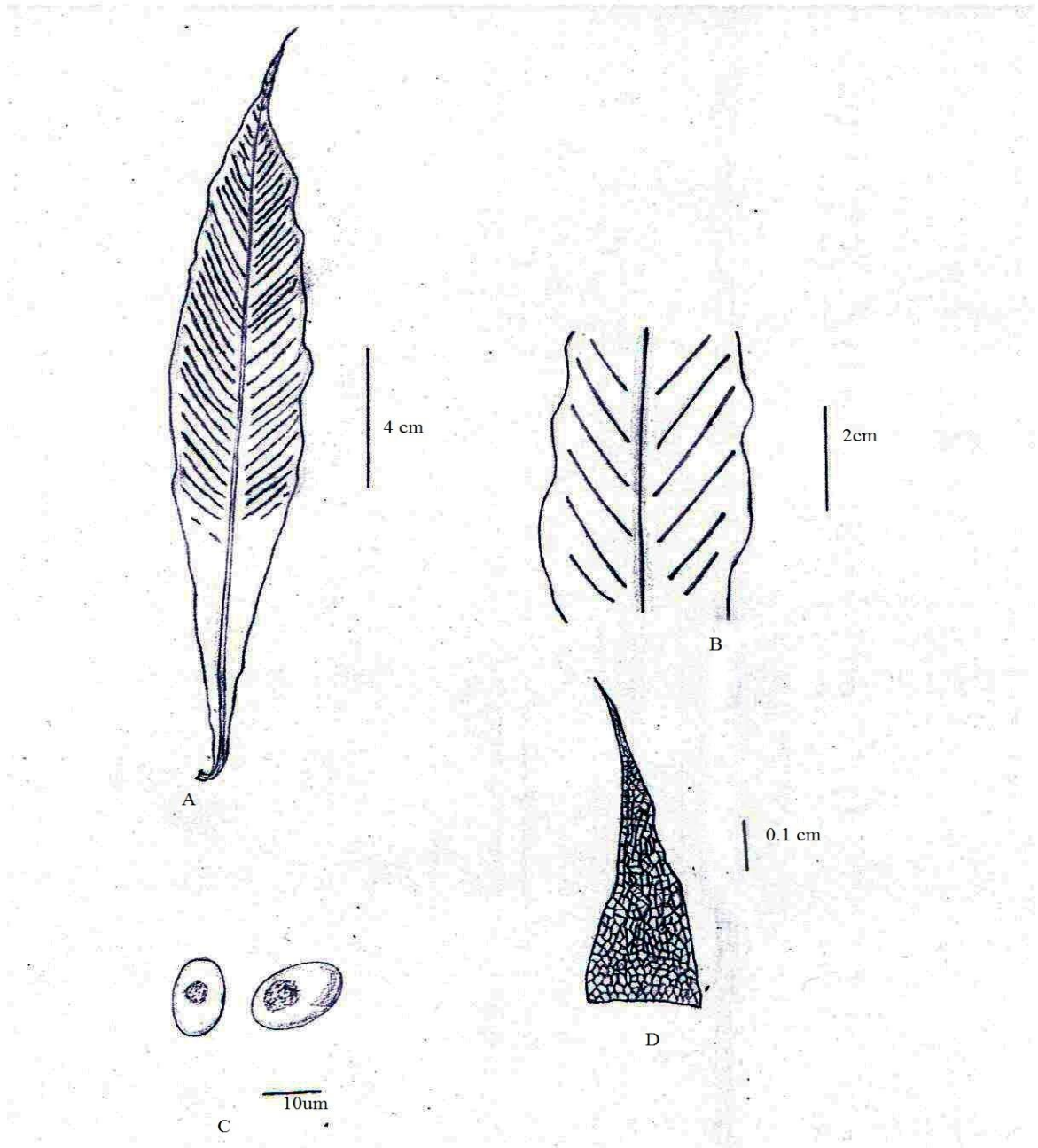


Figure 3.2: A. *Loxogramme porcata* Price ; B. Portion of frond magnified; C. Spore 400x; D. Rhizome scales.

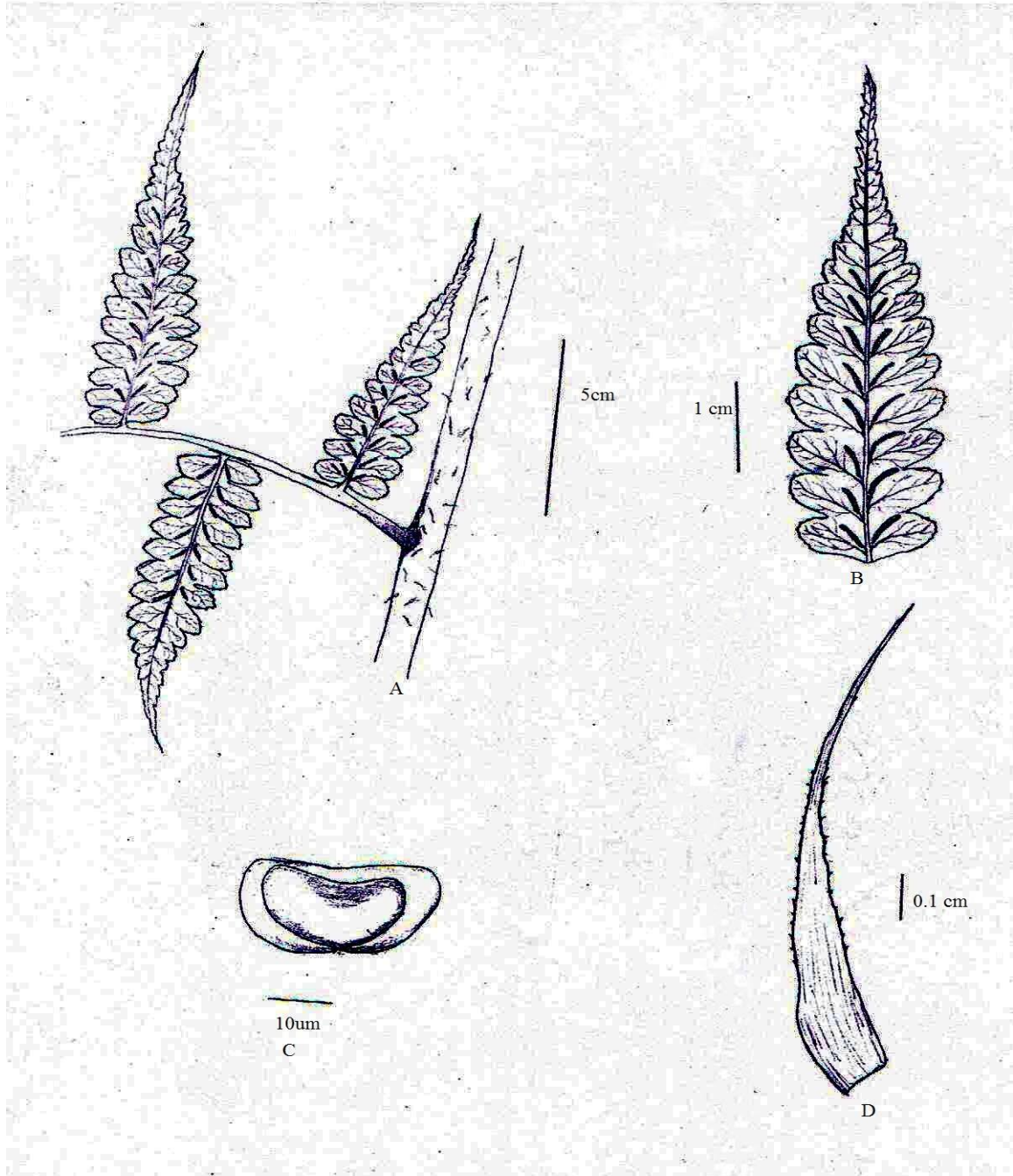


Figure 3.3: A. *Diplazium succulentum* Clarke ; B.Pinnae; C.Spore 400x; D. Scales 20x.

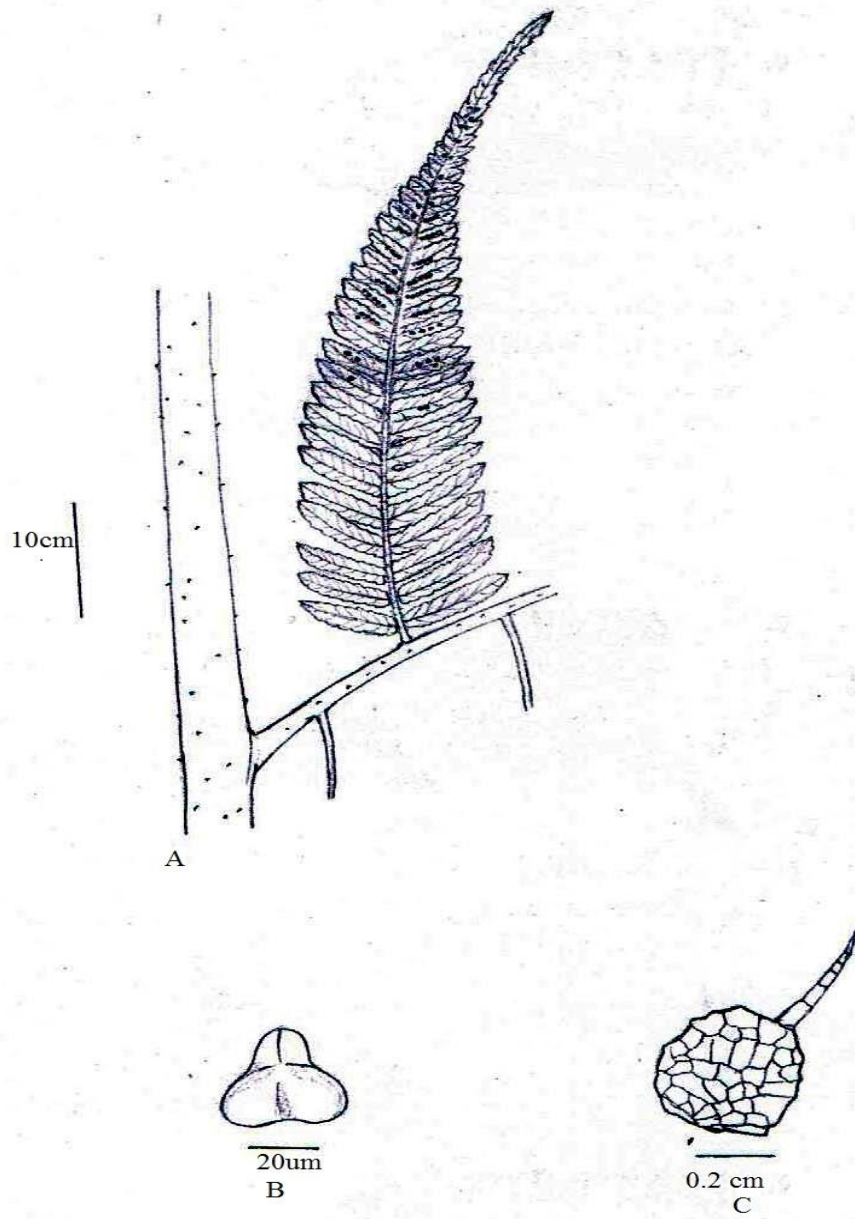


Figure 3.4: A. *Cyathea brunoniana* Clarke ; B. Spores 400x; C. Costule scales

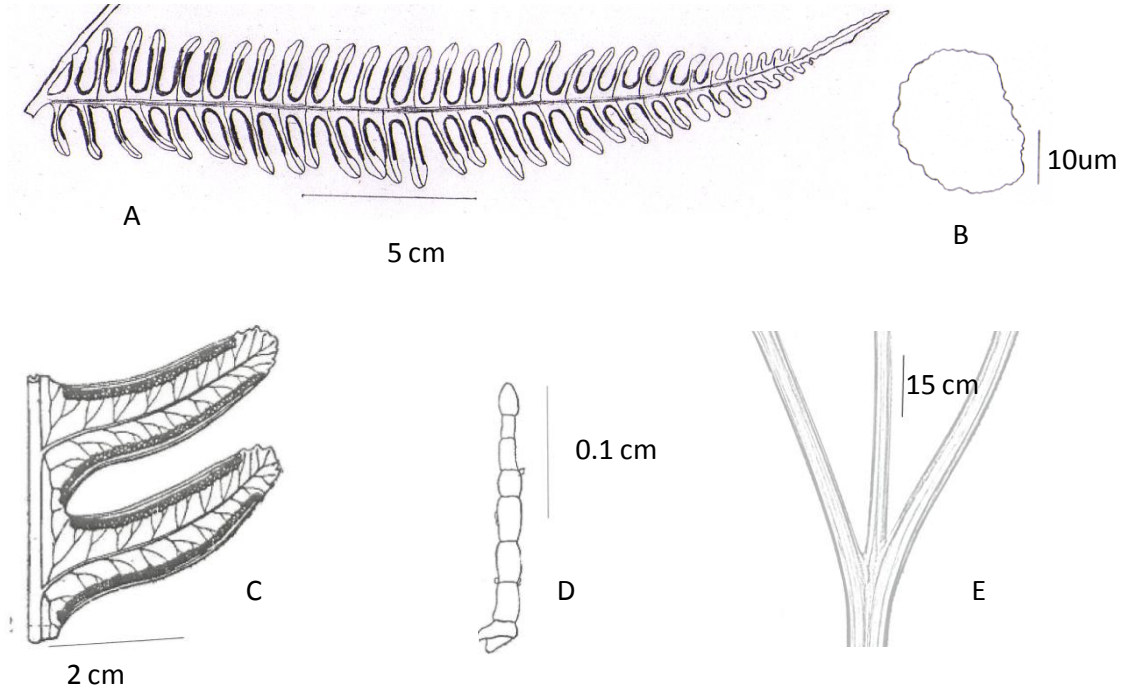


Figure 3.5: A. *Pteris austrosinica* (Ching) Ching; B. Spore 400x; C. Ultimate segment, D. Hairs on the Costules, E. Tripartite stipe .

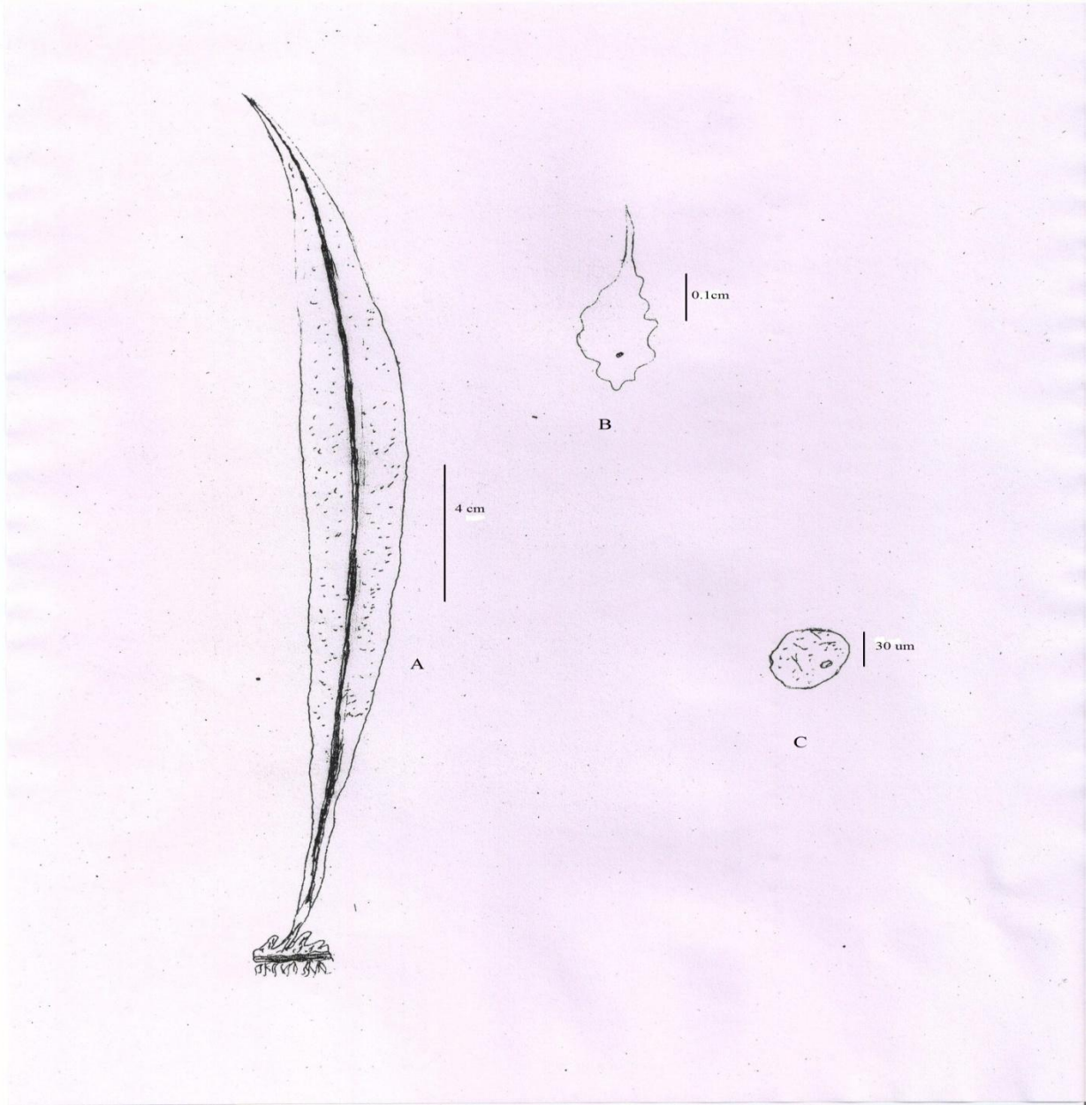


Figure 3.6: A. *Microsorium punctatum*(Linnaeus)Copeland ; B. Rhizome scales 40x; C. Spore 400x.

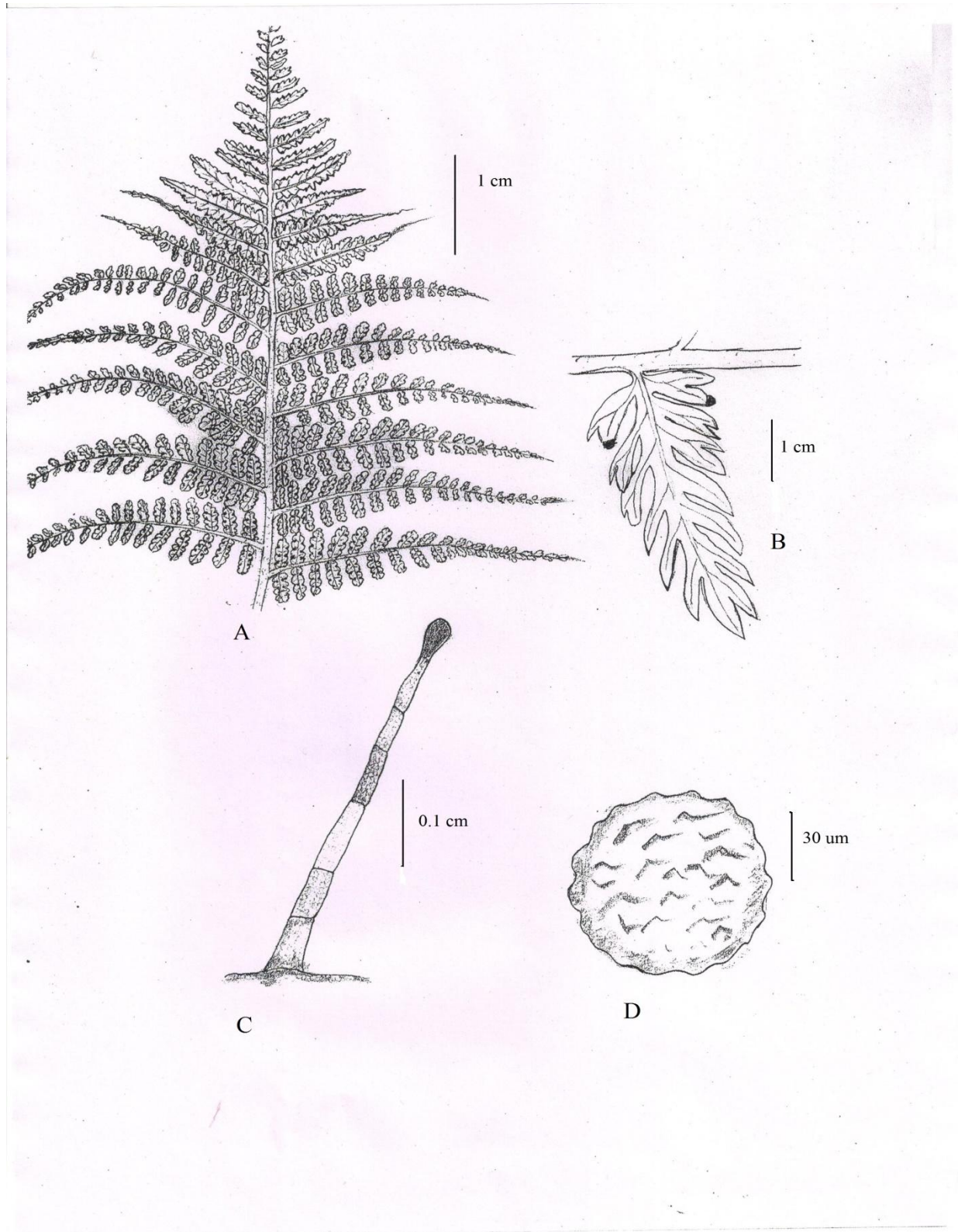


Figure 3. 7: A.*Dennstaedtia apendiculata*(Wallich ex Hooker) Smith ;
B.Pinnae; **C.** Hairs 40x; **D.** Spore 400x

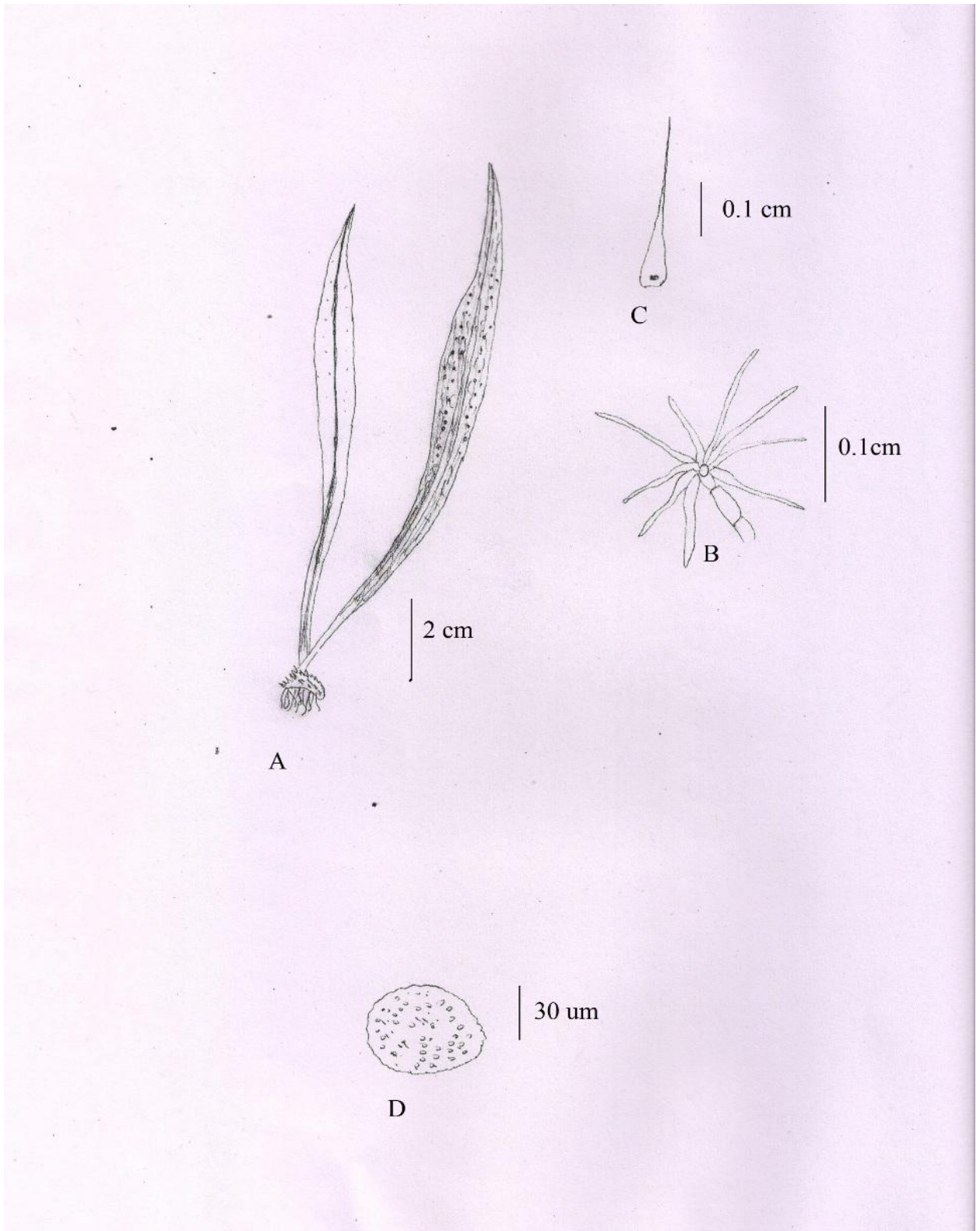


Figure 3. 8: A. *Pyrrhosia mannii* (Giesenh)Ching;B. Stellate hairs 40x;
C. Rhizome Scales 40x;D. Spore 400x.

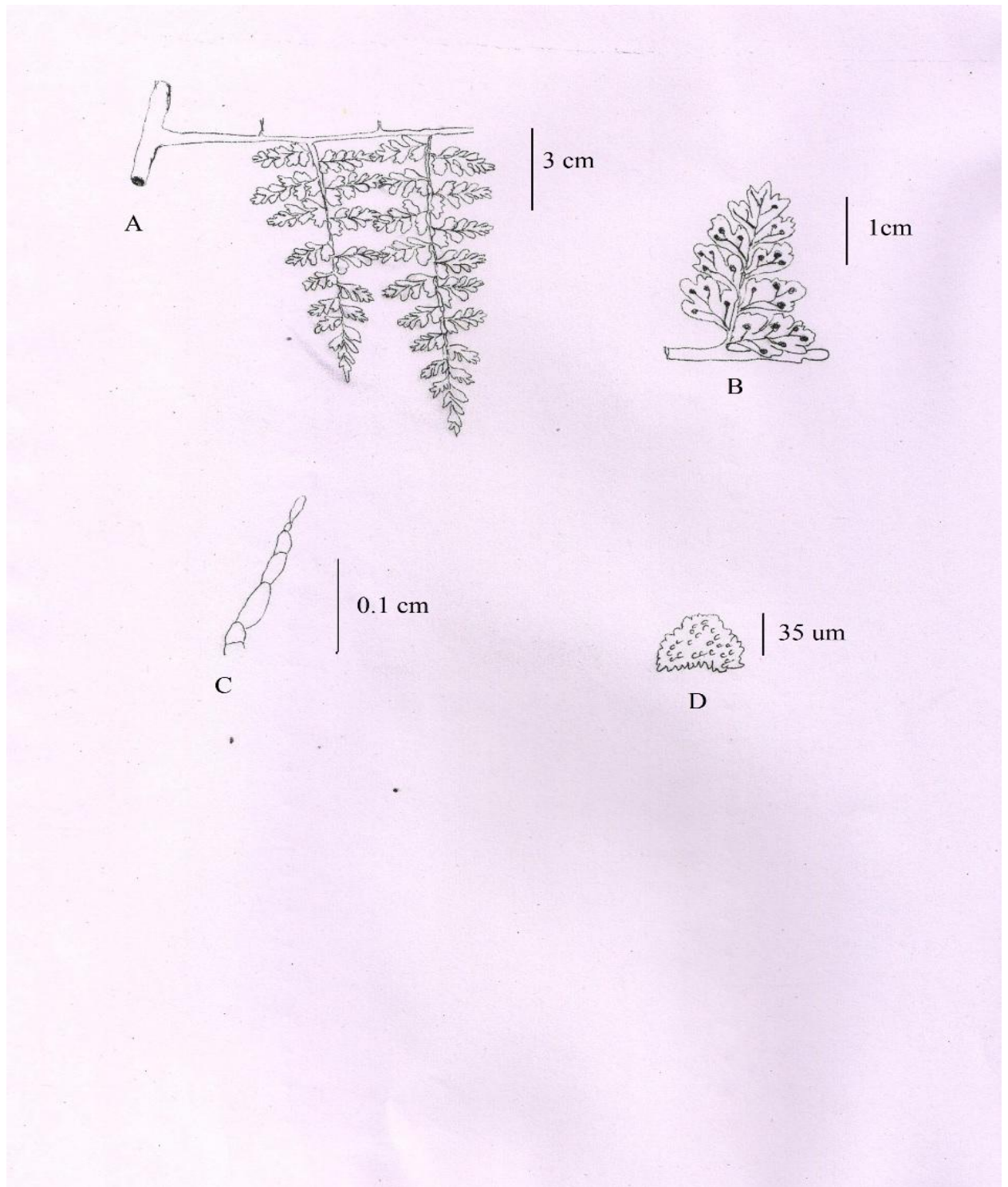


Figure 3. 9: A. *Monachosorum henryi* Christ ; B. Pinnae; C. Hairs 40x; D. Spore 400x.

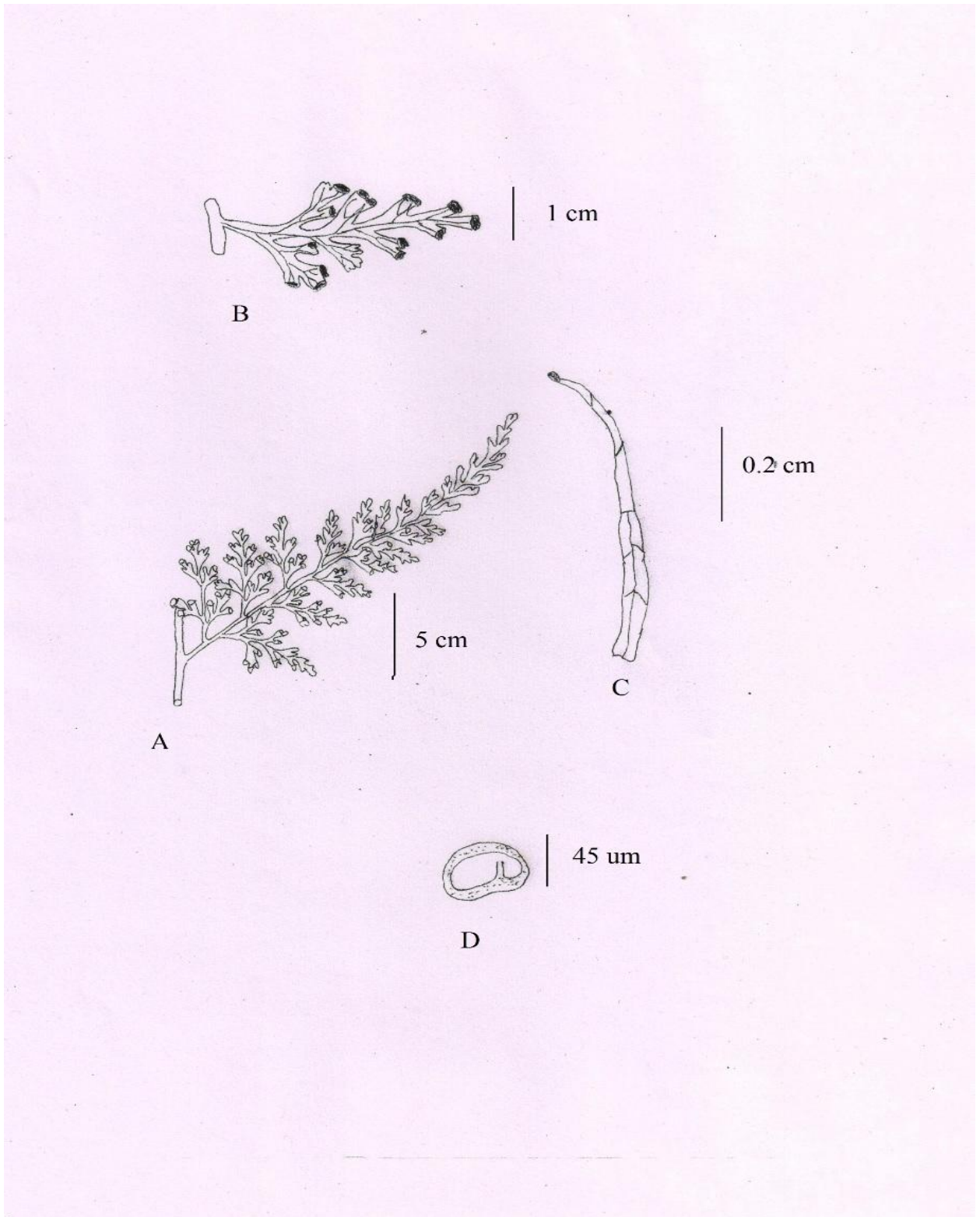


Figure 3. 10: A. *Odontosoria chinensis* (Linnaeus)Smith;Habit; B. Pinnae; C. Hairs 40x; D. Spore 400x.

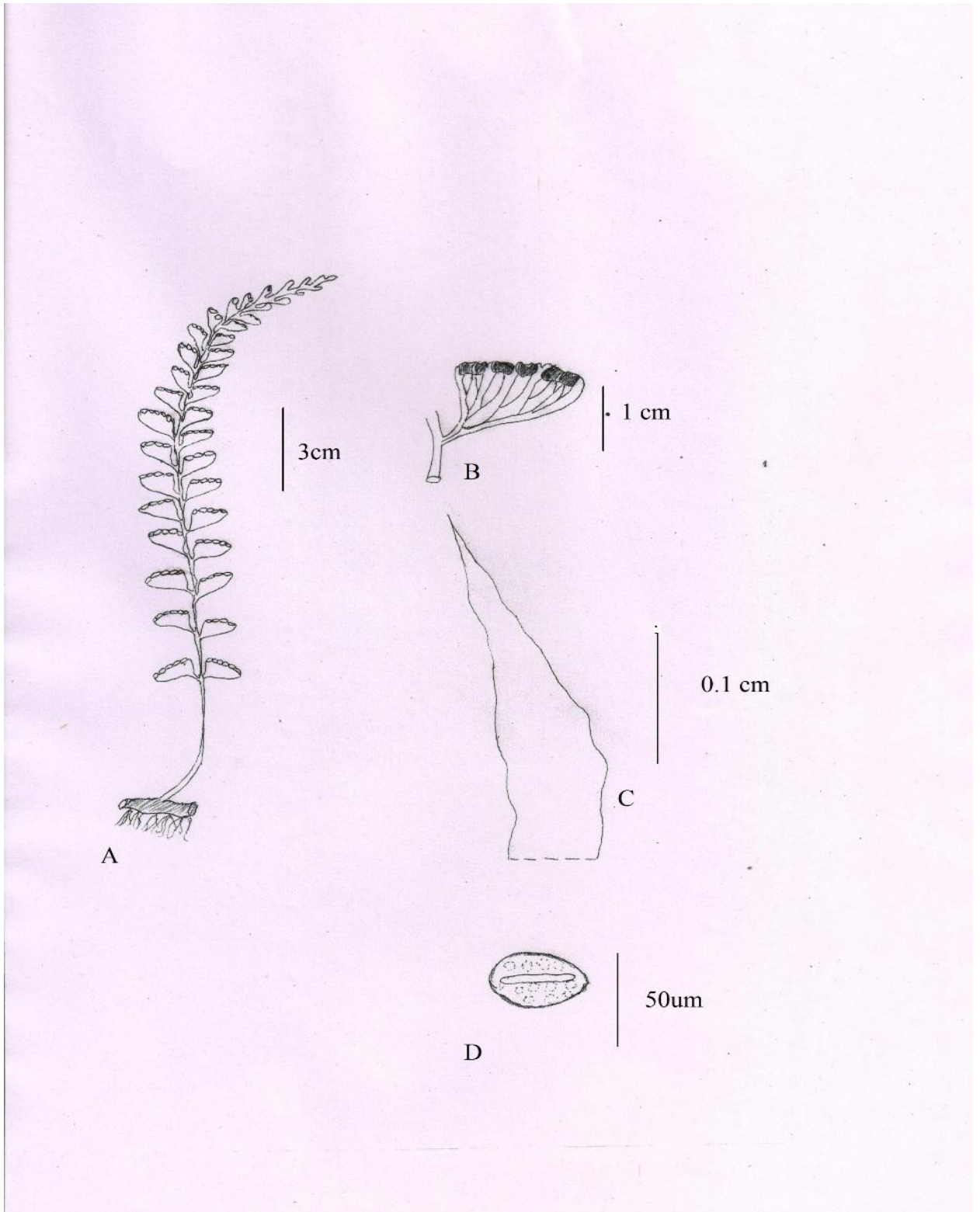


Figure 3. 11: A. *Lindsaea odorata* Roxburgh; B. Pinnae; C. Rhizome scale 40x; D. Spore 400x.

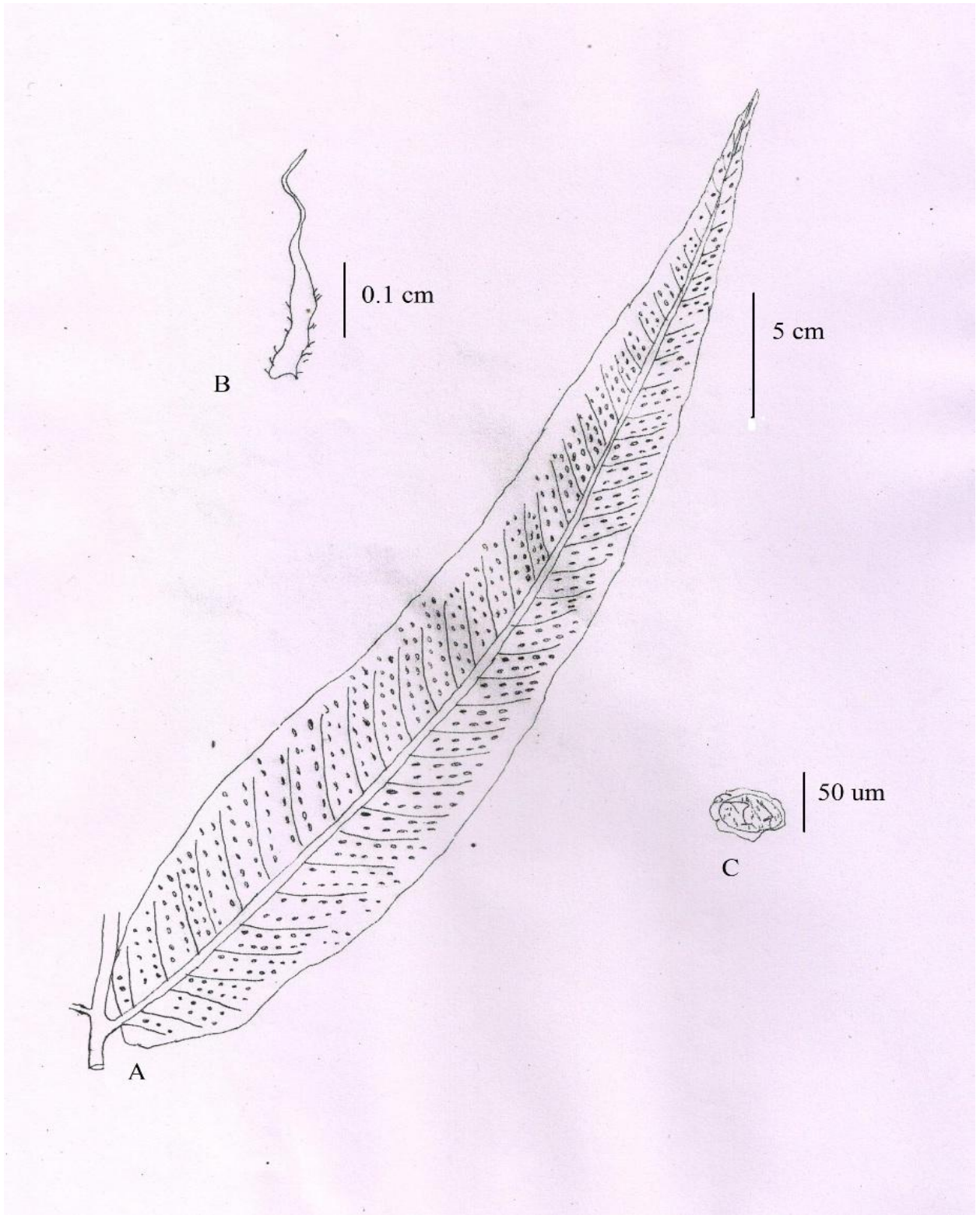


Figure 3. 12: A. *Tectaria polymorpha* (wallich ex Hooker)Copeland ; B. Rhizome scales 40x; C. Spore 400x.

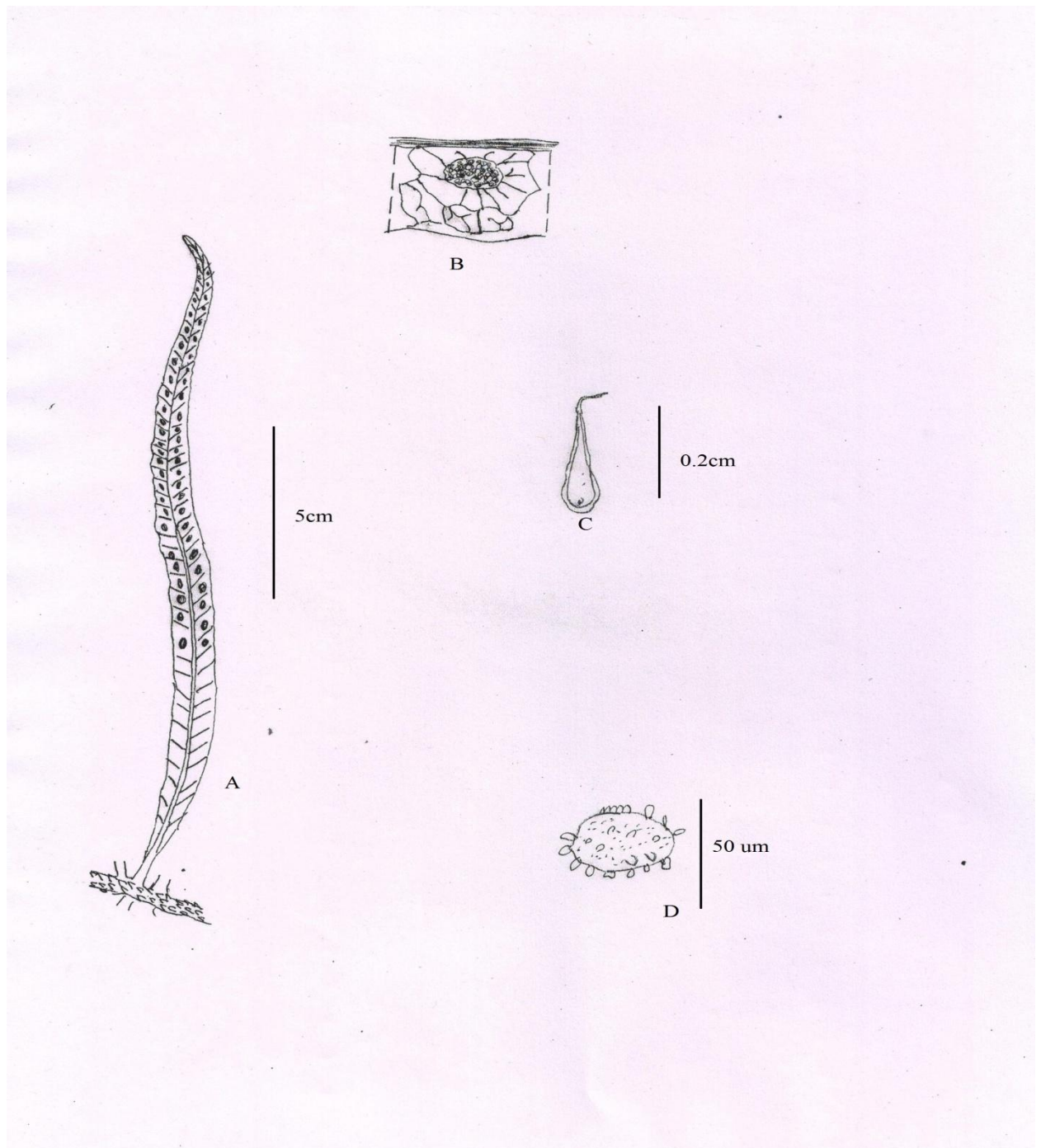


Figure 3.13: A. *Lepisorus mehrae* Fraser-Jenkins; B. Veins and sori; C. Rhizome scales;D. Spore 400x.

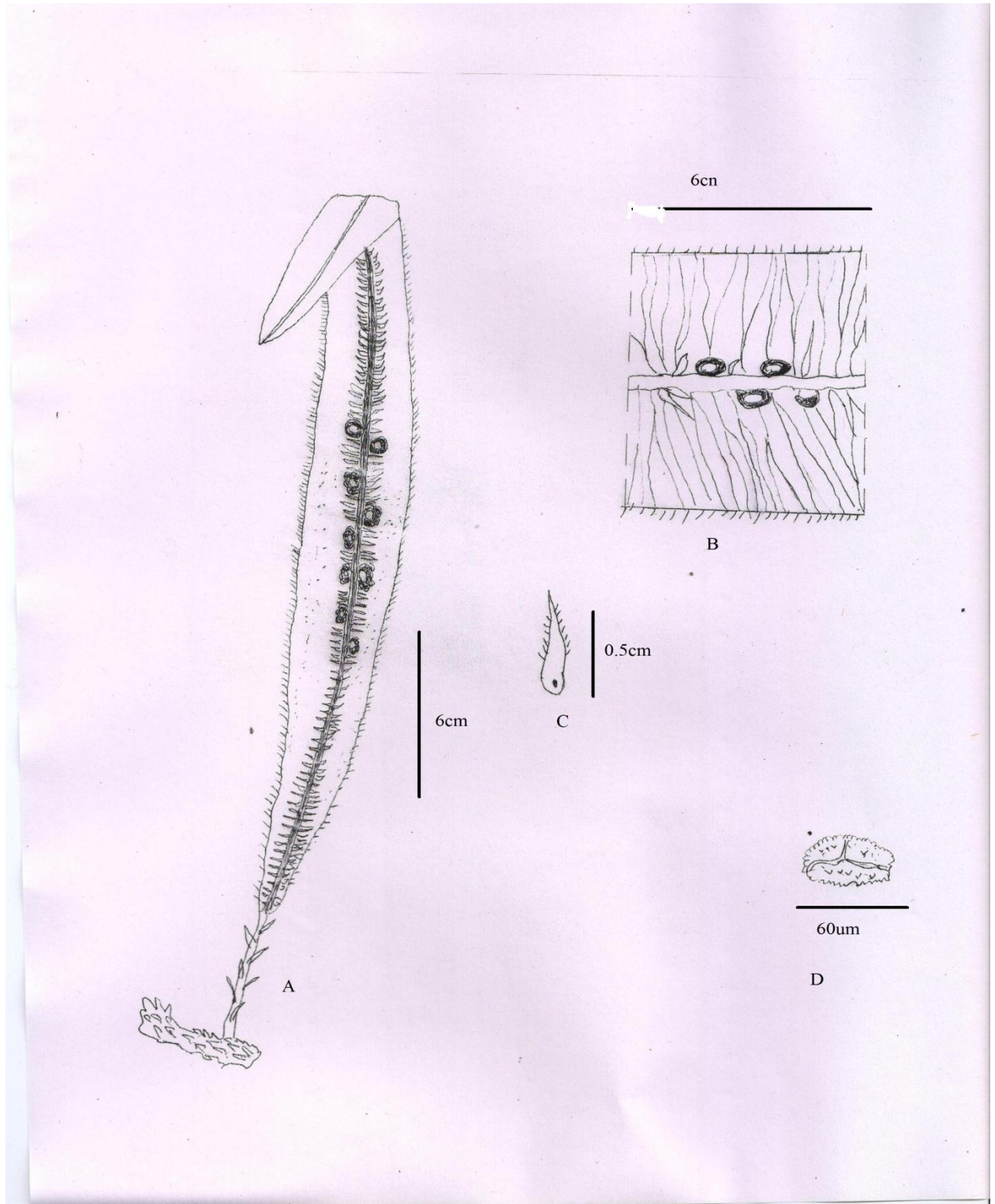


Fig 3.14:A. *Oleandra wallichii* (Hooker)Presl; B. Veins and Sori; C. Scales 20x; D.Spore 400x.

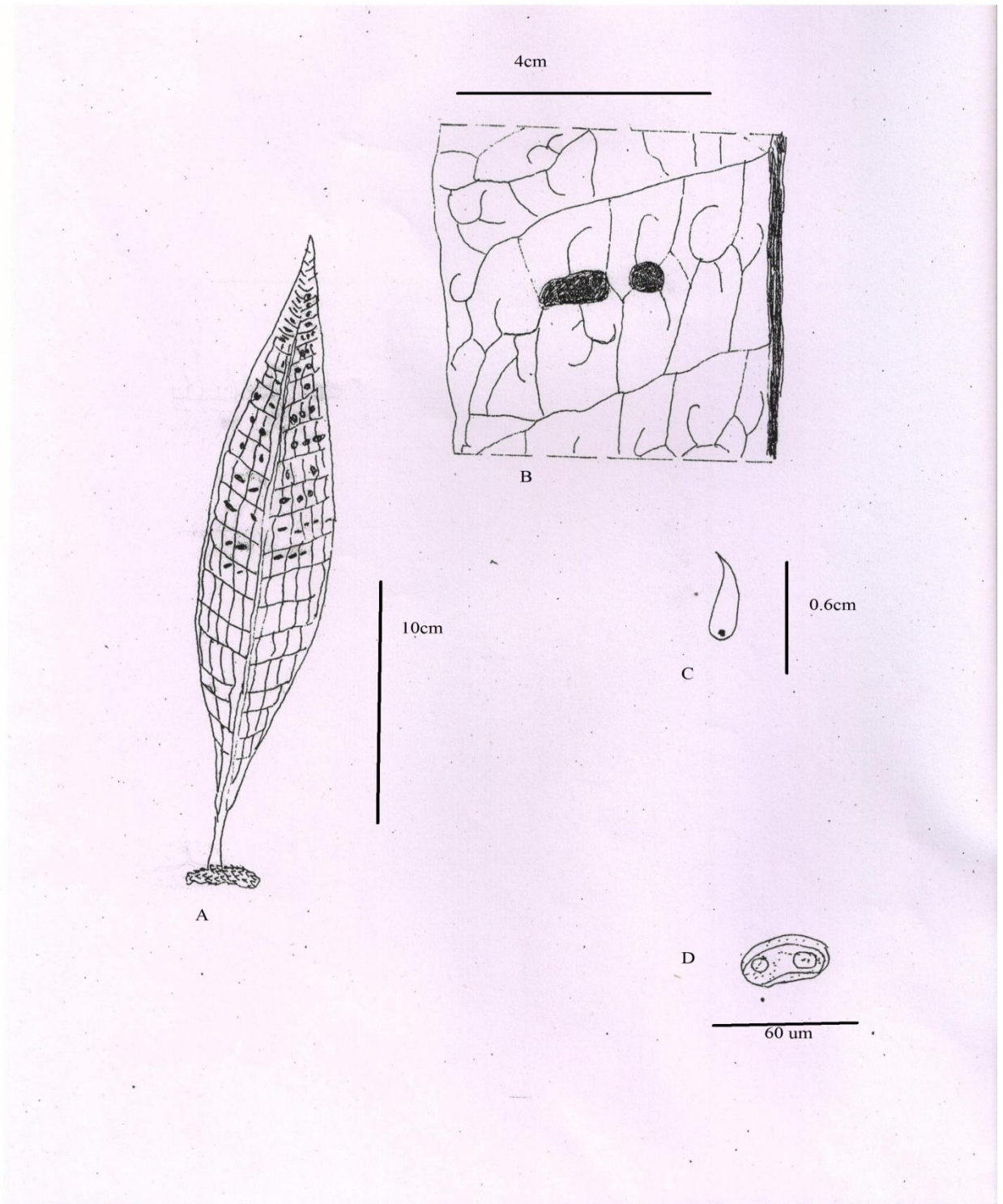


Figure 3.15: A. *Leptochilus decurrens* Blume subsp. *helmiontideus* Frase-Jenkins; B. Veins and sori; C. Scales 20x; Spore 400x.

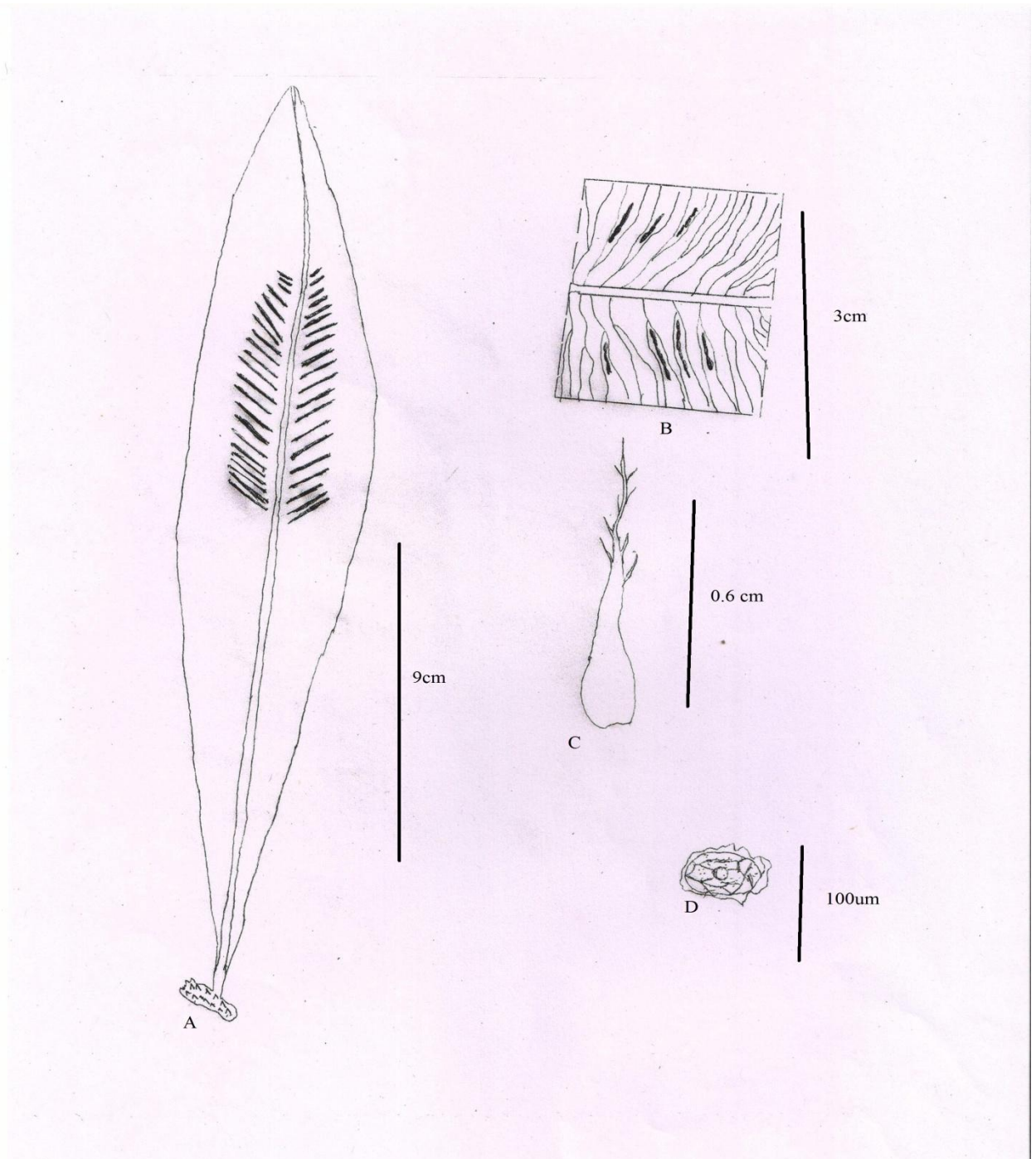


Figure 3.16: A. *Asplenium phyllitidis* D.Don; B. Veins and sori; C. Scales 20x; D. Spore 400x.

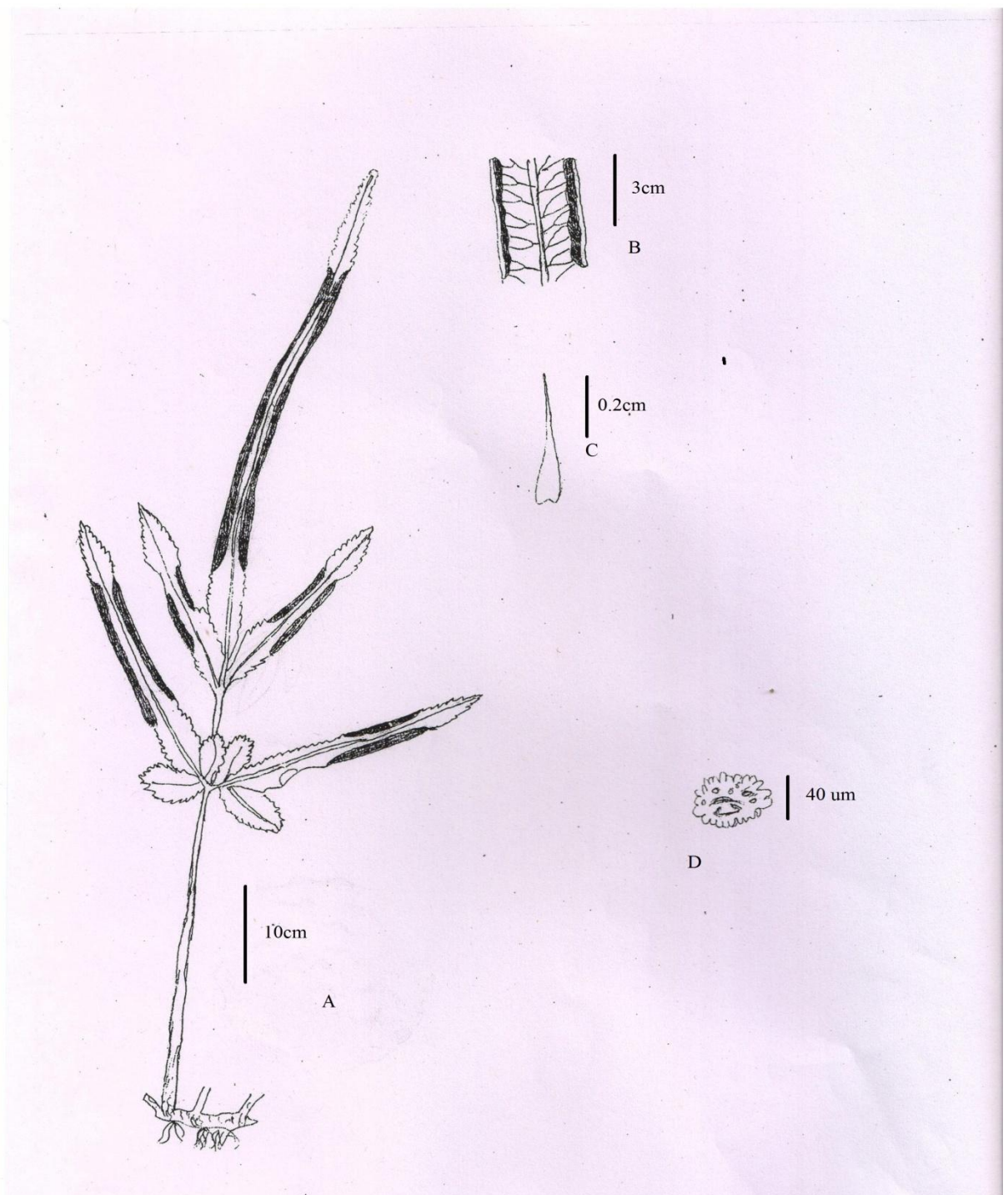


Figure 3.17: A. *Pteris ensiformis* N.L Burman; B. Pinnae with sori and veins; C. Scales 20x; spore 400x.

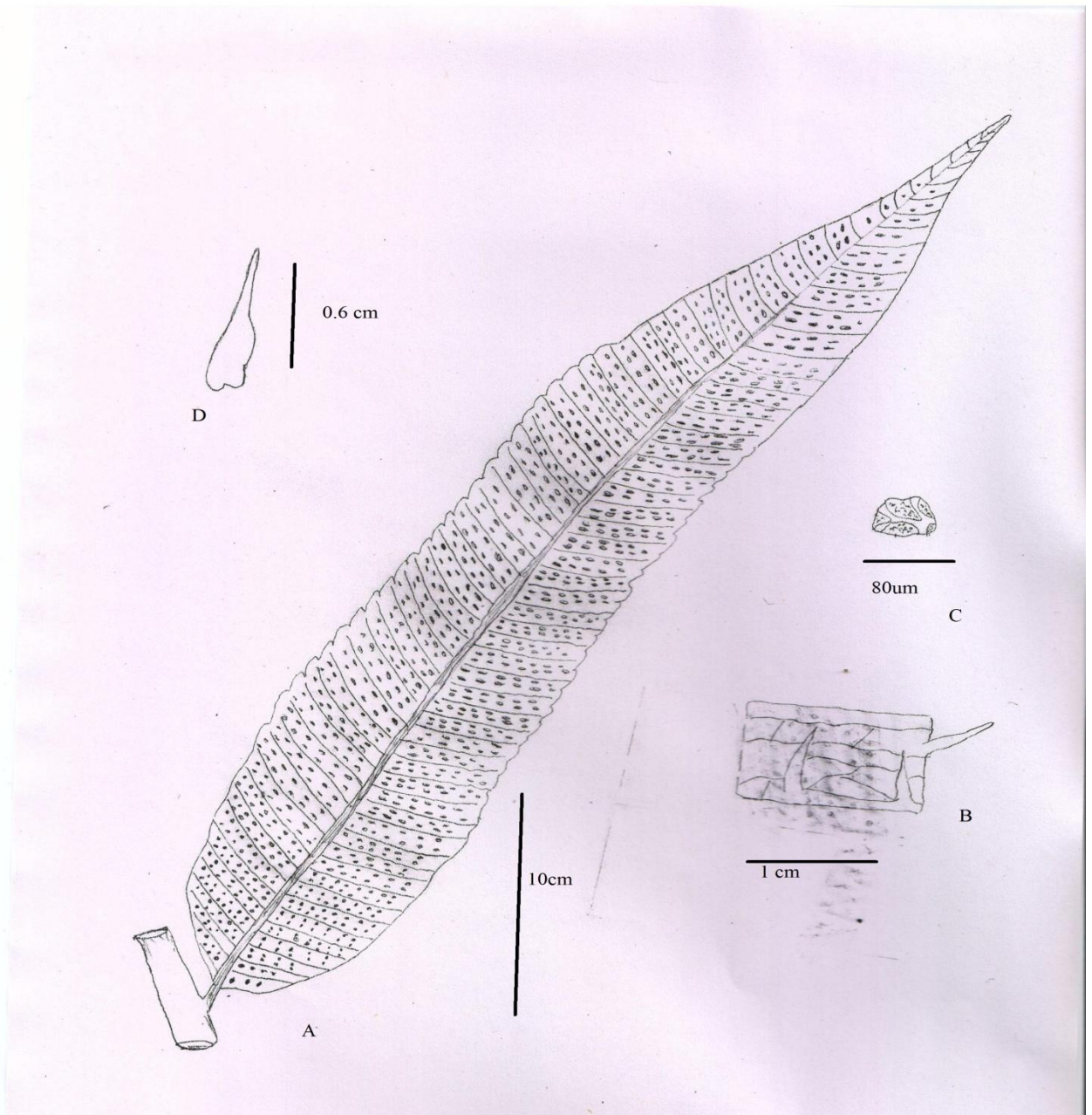


Figure 3.18: A. *Thelypteris lakhimpurensis* (Rosenst.) Iwatsuki ; B. Hairs 20x; C. Spore 400x.

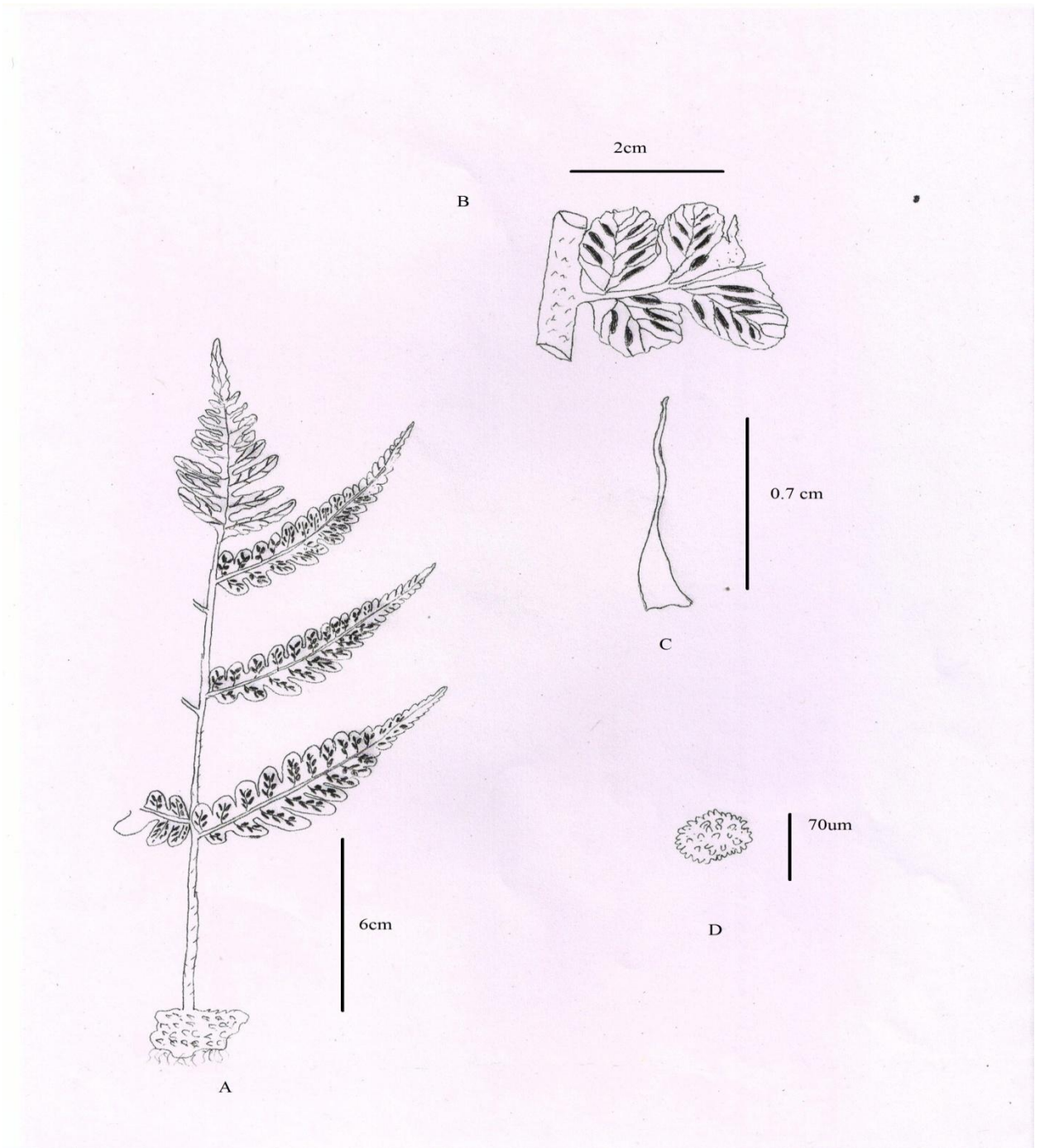


Figure 3.19: A. *Deparia petersenii* (Kunze)Kato;B. Portion of Pinnae; C. Scales 40x; Spore 400x.

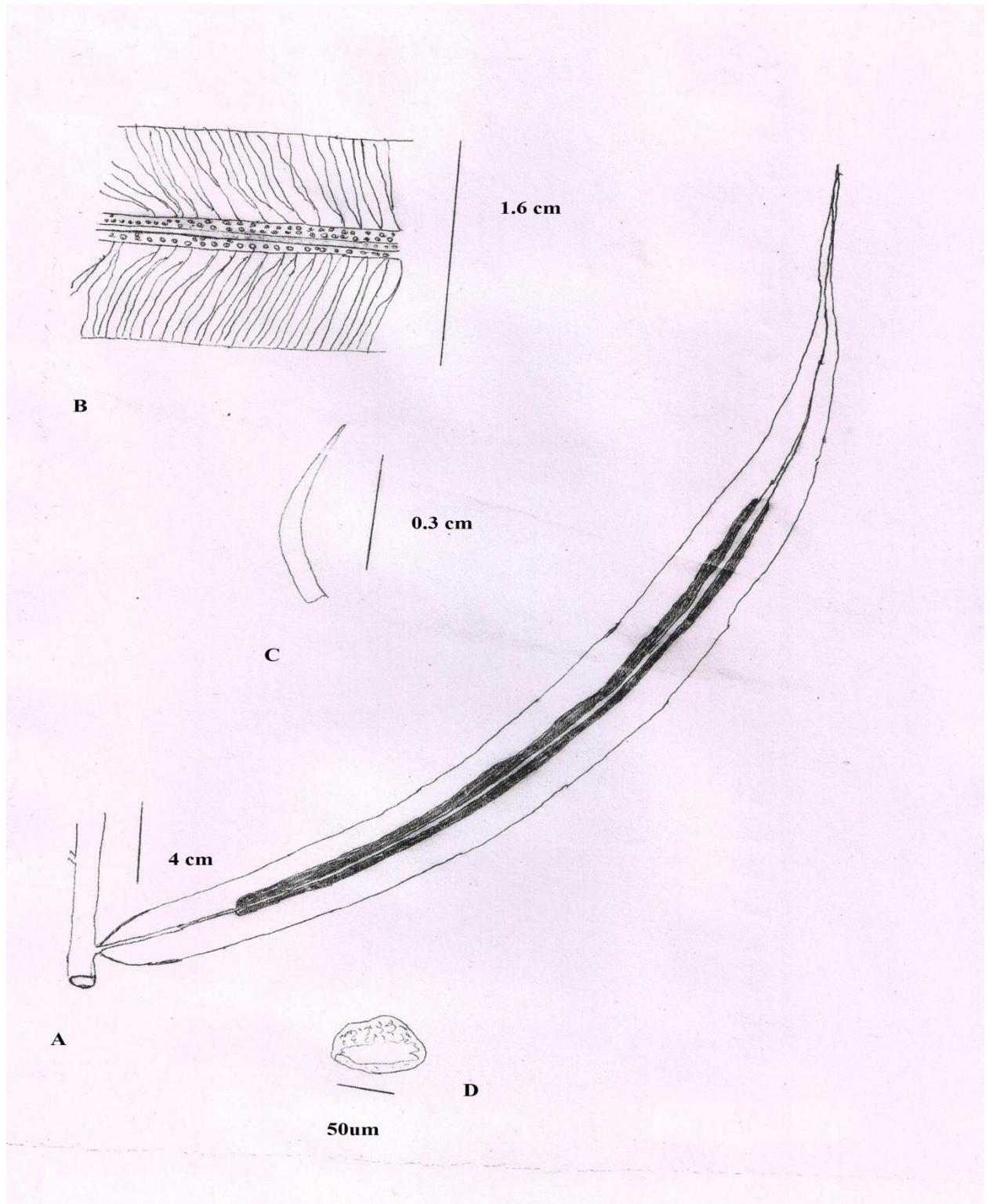


Figure 3.20: A. *Blechnum orientale* Linnaeus; B. Portion of Pinnae; C. Scales 20x; D. spore 400x.

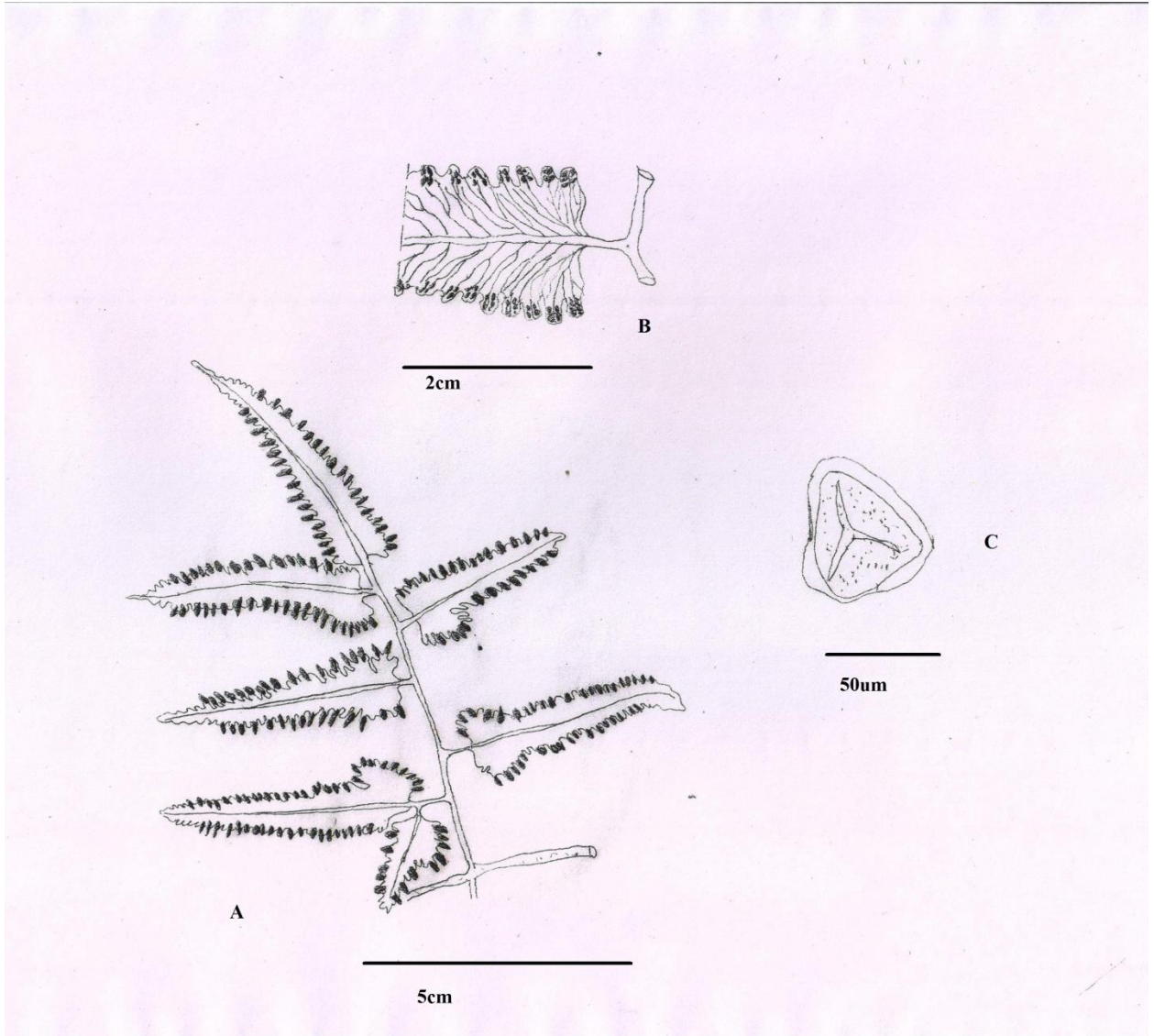


Figure 3.21:A. *Lygodium flexuosum*(Linnaeus)Swartz; B.Portion of Pinnae; C. Spores 400x.

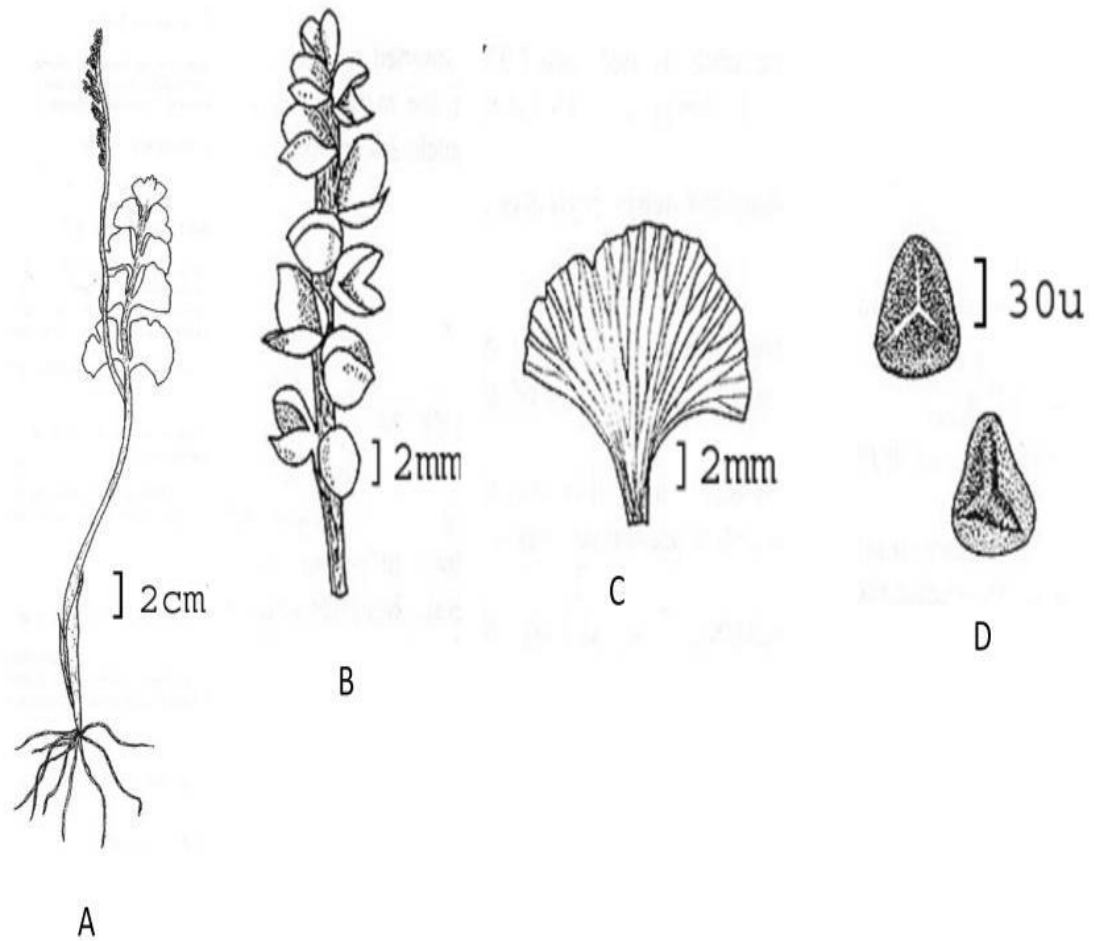


Figure 3.22: A *Botrychium lunaria*(Linnaeus) Swartz; B. Fertile sporophore; C. Sterile pinnae showing venation; D. Spores 400x.



PLATE – 3.1. Lycopods of Darjeeling Hills: A. *Huperzia serrata*(Thunberg)Trevisan; B. *Huperzia pulcherrima* (Wallich ex Hooker et Greville)Pich-Sermolli; C. *Huperzia squarrosa* (Froster) Trevisan; D. *Huperzia ceylanica*(Spring) Trevisan; E. *Huperzia heteriana*(Kummerle) T. Sen & U. Sen; F. *Huperzia hamiltonii* (Sprengel)Trevisan; G. *Lycopodium japonicum* Thunberg ;H. *Lycopodiella cernua*(Linnaeus)Pich-Sermolli



Plate 3.2: A. *Selaginella subdiaphana* (Wallich ex Hooker & Greville) Spring; B. Strobilus ; C. Ventral Leaf; D. Ventral Leaf base magnified 100x; E. Median leaf 40x; F. Microsporophyll (Microsporangium) 40x; G. Megasporangium 400x ; H. Megaspore 400x; I. Microspore 400x.

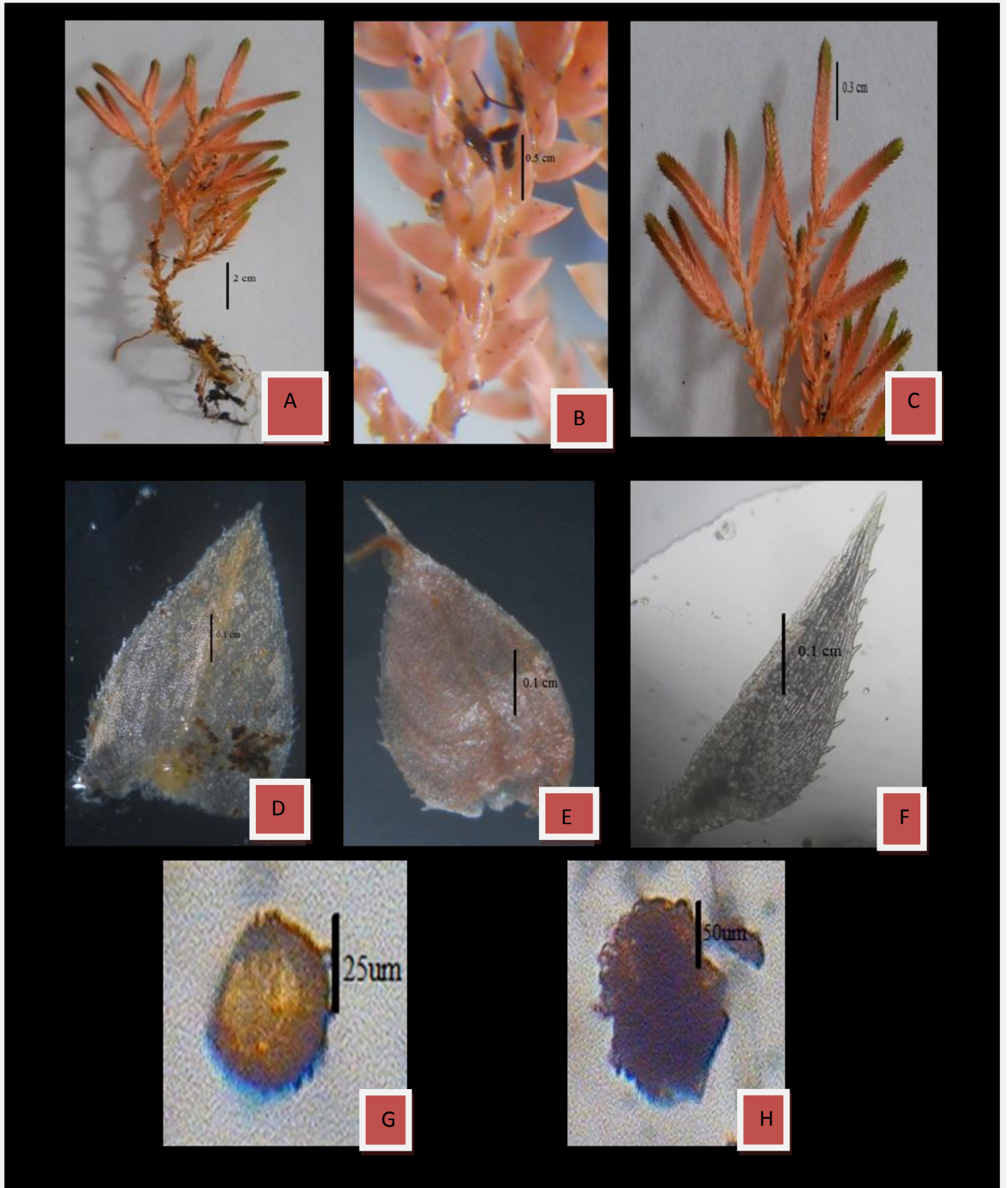


Plate 3.3: A. *Selaginella repanda* (Desvaux ex Poiret) Spring ;B. Stem with leaf; C.Strobilus; D. Ventral leaf;E. Median Leaf; F. Sporophyll; G. Microspore 400x; H. Megaspore 400x.



Plate 3.4: A.*Equisetum arvense* Linnaeus subsp.*diffusum* Fraser-Jenkins; **B.**Node and internode; **C.** Spore 100x.**D.** *Equisetum ramosissimum* Desf.;**E.** Strobilus;**F.** Immature spore 100x.

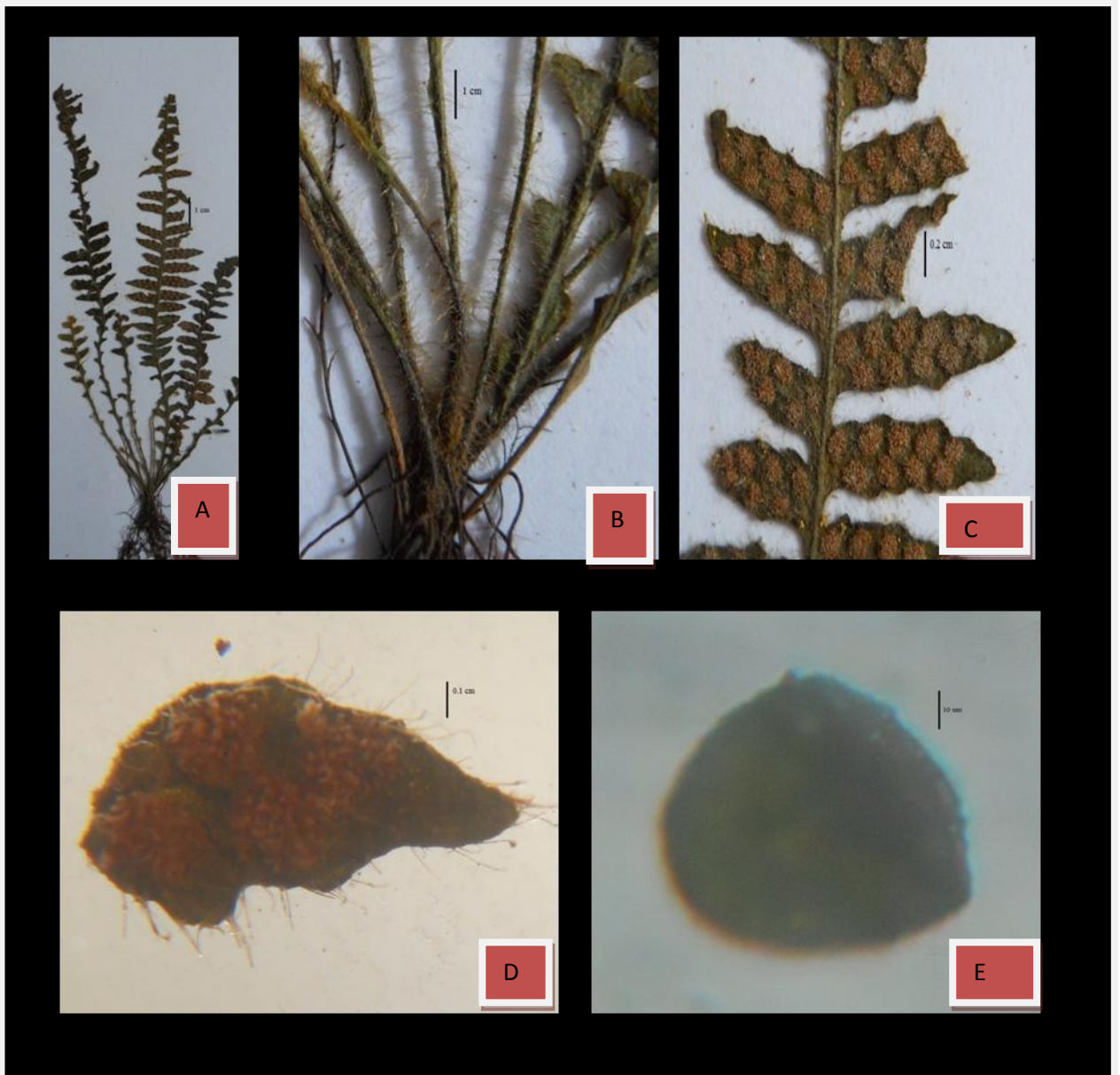


Plate 3.5: A. *Tomophyllum donianum* (D.Don)Fraser-Jenkins; B. Stipe with Hairs; C. Pinnae; D. Pinnae with sori; E. Spore 400x.



Plate 3.6: A. *Dryopsis apiciflora* (Wallich ex Mettineus)Holtum & Edwards; B. Pinnae; C. Lobes with veins 40x; D. Rhizome Scales 40x; E. Spore 400x; F. *Polystichum mehrae* Fraser-Jenkins(Habit).



Plate 3.7: A. *Osmunda claytoniana* Linnaeus subsp *vestita* (Wallich ex Milde) A.Love & D.Love (Habit); B. young crozier;C. Young fronds;D. Pinnae And sori; E & F. *Ophioglossum reticulatum* Linnaeus (Habit and Habitat); G. *Botrychium lanuginosum* Wallich ex Hooker & Greville; H. Forking of Sporophore and Tropophore;I. Spore 100x.



Plate 3.8: A. *Hymenophyllum exsertum* Wallich ex Hooker; B. Hairs 40x; C. Pinnae 20x; D. Sporangium 100x; E. Involucre 40x; F. Spore 100x; G. *Vittaria taeniophylla* Copeland; H. *Woodwardia unigemmata* (Makino) Nakai; I. *Dryopteris woodsii* Hayata.



Plate 3.9: A. *Seliguela griffithiana* (Hooker)Fraser-Jenkins; B.Pinnae; c. Rhizome scales 40x; D. Sporangium 100x; E. Spore 400x; F &G. *Crytomium caryotideum* (Wallich ex Hooker & Greville)C.Presl; H. Pinnae ; I. *Phanerophlebiopsis hookeriana* (C.Presl) Fraser-Jenkins.



Plate 3.10: A. *Aleuritopteris formosona* (Hayata)Tagawa;B. Stipe with scales; C.Scales 40x;D.Spore 100x;E. *Aleuritopteris chrysophylla* (Hooker)Ching; F.*Aleuritopteris albomarginata* (C.B Clarke) Ching.

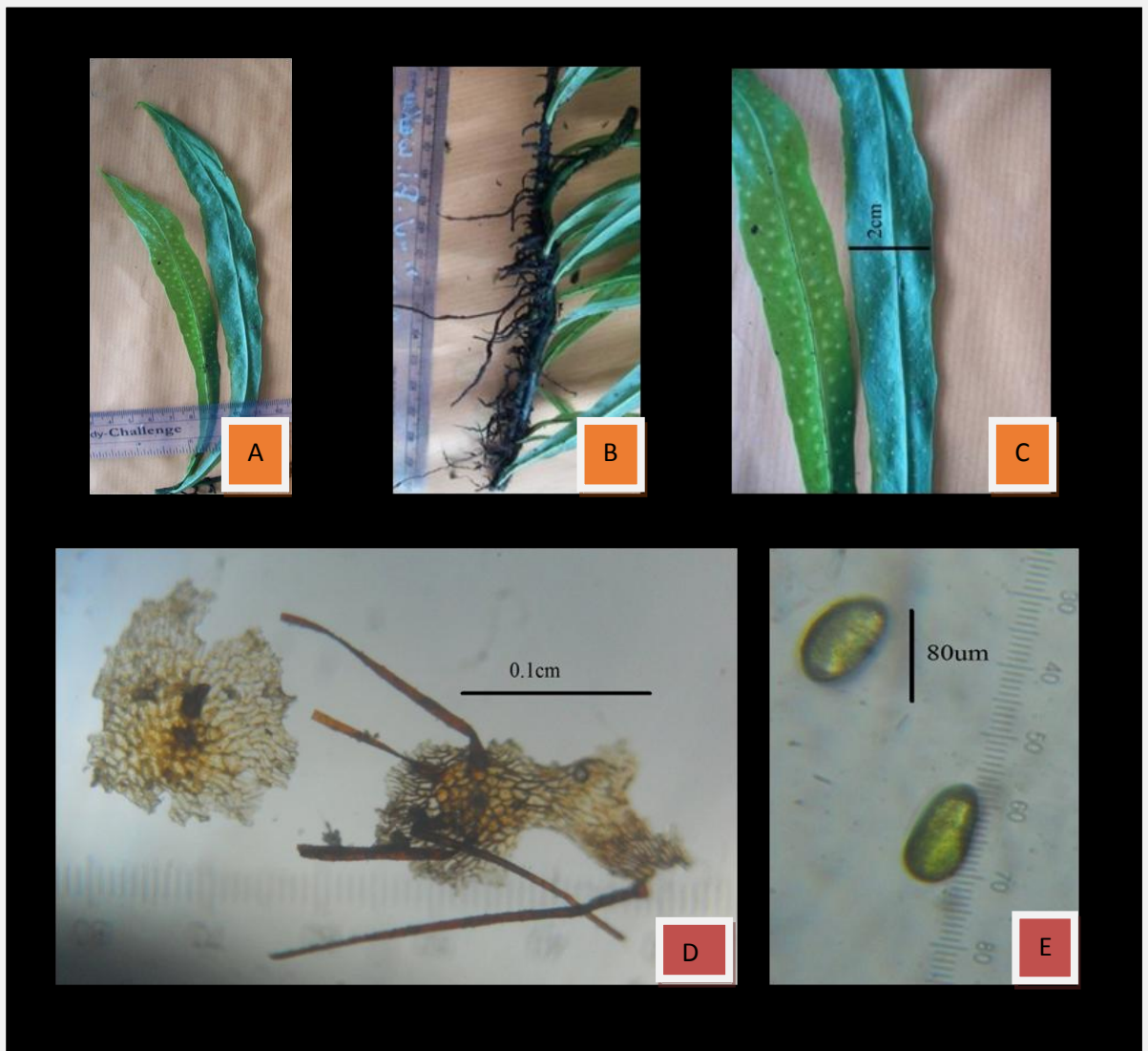


Plate 3.11: A. *Tricholepidium normale* (D.Don)Ching; B. Clinging root; C. Veins and Sori; D. Scales with setae; Spore 100x.



Plate 3.12:A. *Polystichum perscotianum* (Wallich ex Mettenius)
T.Moore; B.Scales on Stipe; C.Micro scales on Segment; D.Spore 100x.



Plate 3.13:A. *Thelypteris cana* (Baker)Ching;B.Pinnae; C.Segmnets hairy; D. Rachis hairy; E.Sporangium 100x; F. Spore 400x.

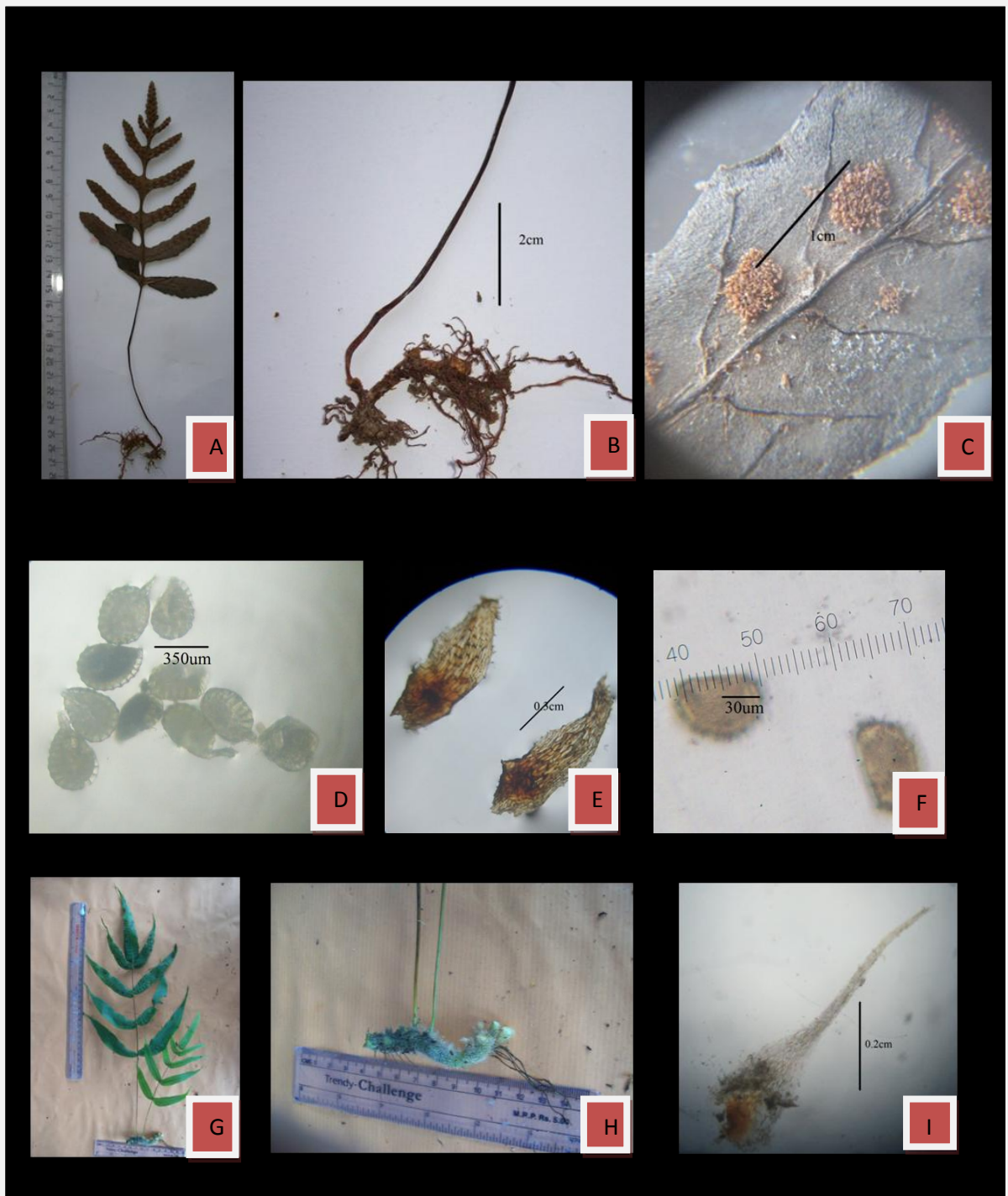


Plate 3.14: A. *Pichisermolodes crenato-pinnata* (C.B Clarke) Fraser-Jenkins; B.Stipe; C. Pinnae; D.Scales 40x; E. Spore 100x; F. *Atrthromers lehmannii* (Mettenius)Ching ;G. Rhizome;H. Scales 40x.

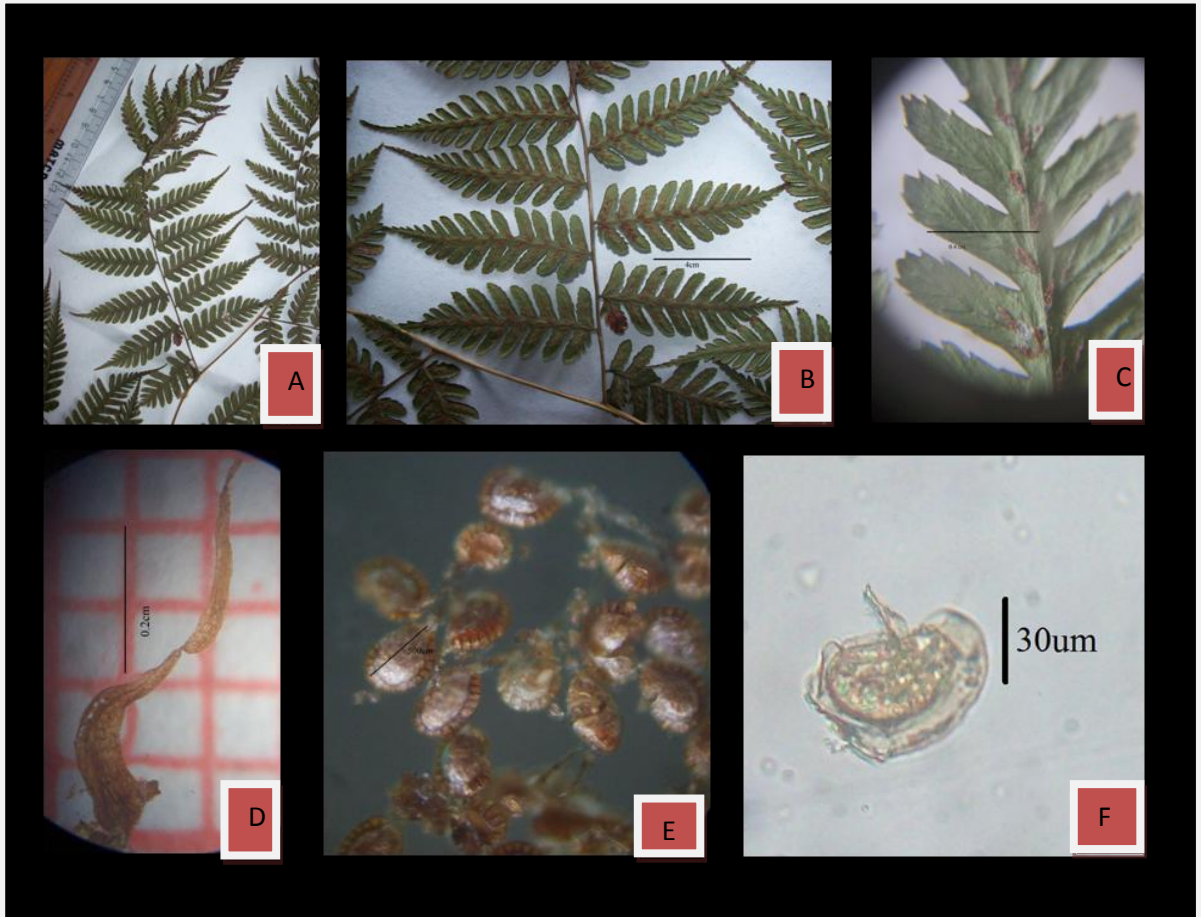


Plate 3.15: A. *Diplazium spectabile* (Wallich ex Mettenius)Ching; B. Pinnae; C. Segment 20x;D. Scales 40x; E.Sporangium 100x; F. Spore 400x.



Plate 3.16: A. *Athyrium clarkei* Beddome; B. Rachis with bulbils; C. Segment 20x; D. Scale 20x; E. Spore 400x.

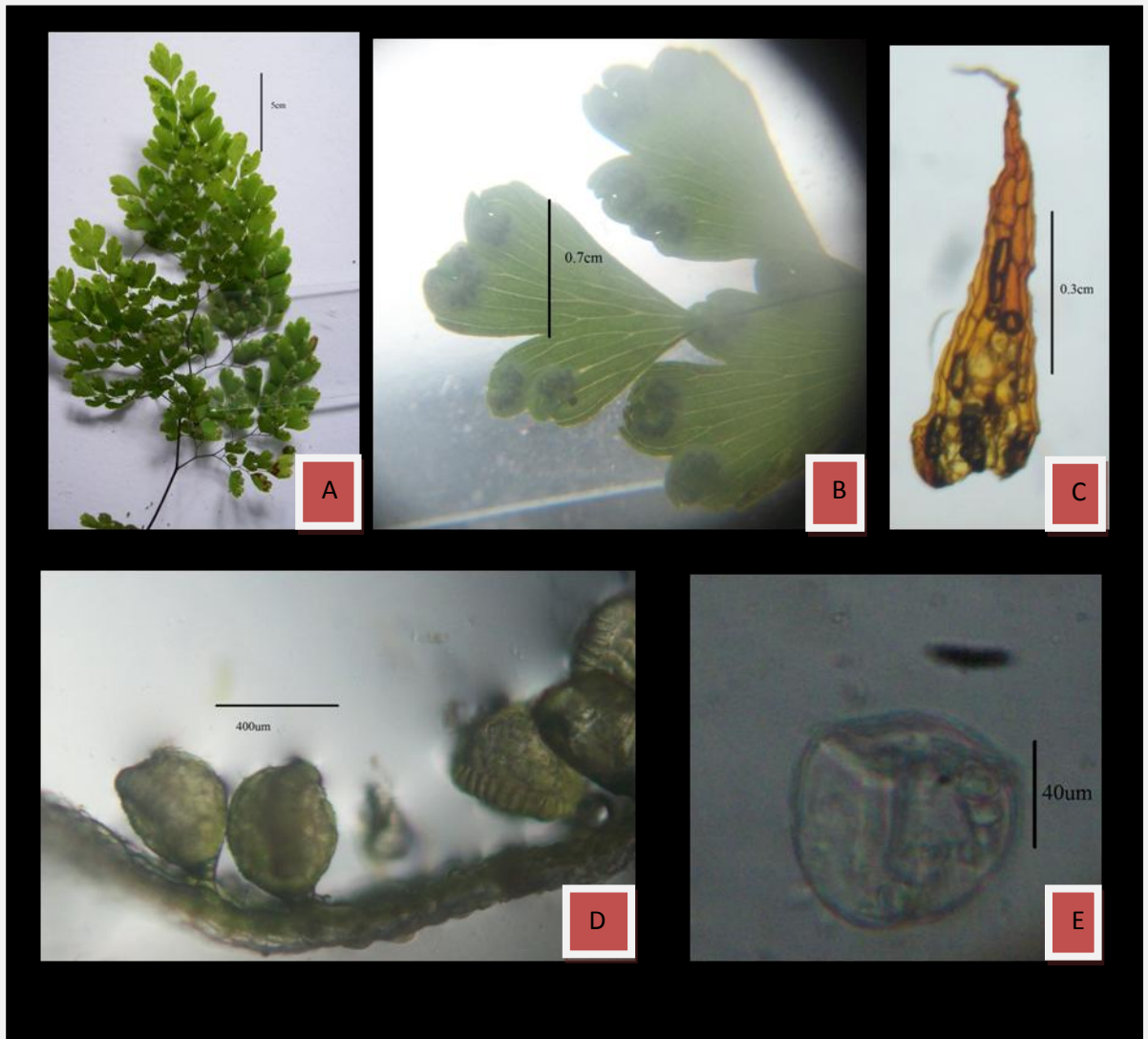


Plate 3.17: A. *Adiantum venustum* D. Don; B. Ultimate segment with sori; C. Scales 20x; D. Sporangium 100x; E. Spore 400x.

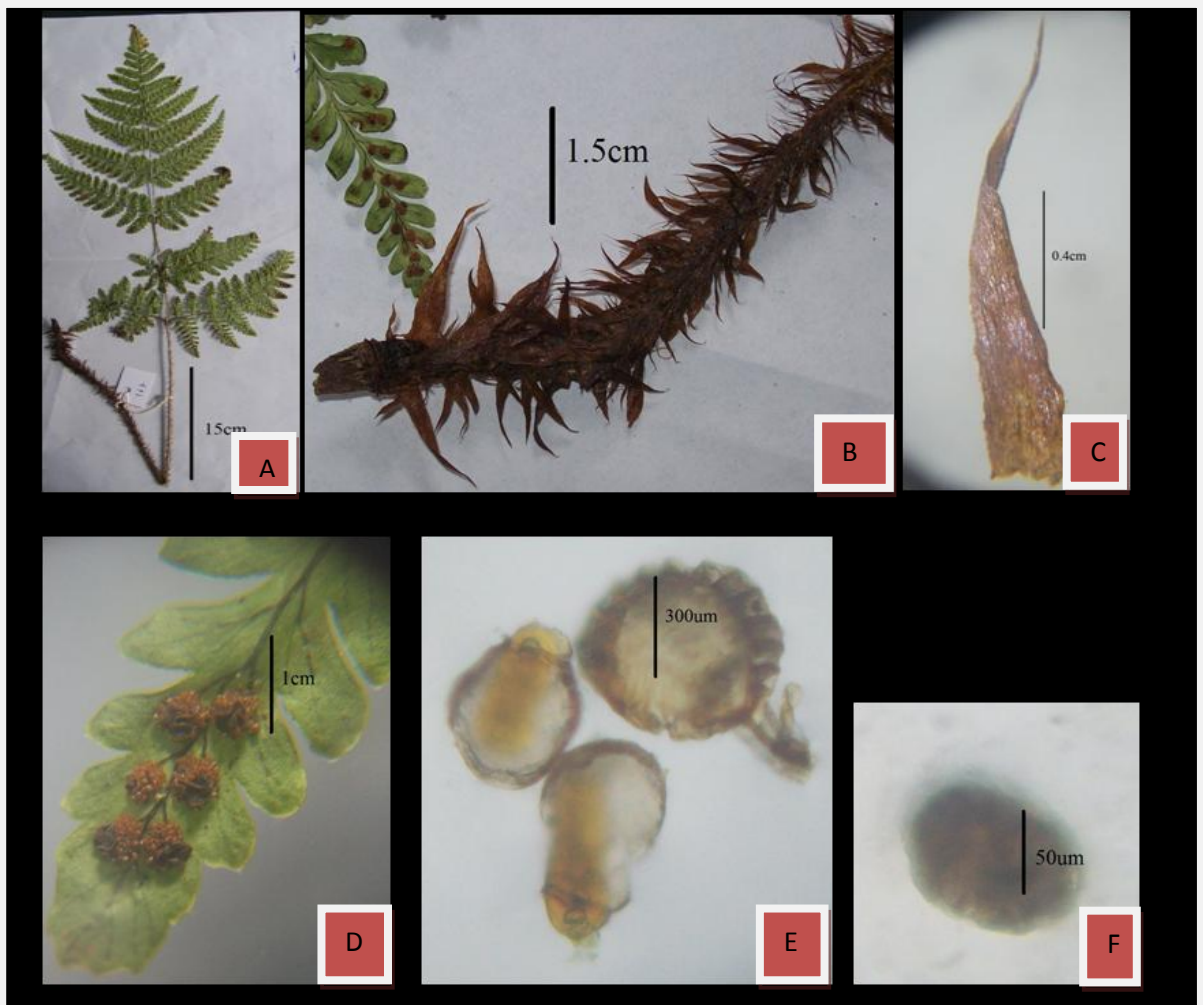


Plate 3.18: A. *Nothoperanema squamiseta* (Hooker) Ching; B. Scales on Stipe; C. Scale 20x; D. Segment with Sori; E. Sporangium 100x; F. Spore 400x.



Plate 3.19: A. *Cerosora microphylla* (Hooker) R.M Tryon; B. Segments with Sori; C. Spore 400; D. *Dryopteris splendens* (Hooker) Kuntze; E. Scales; F. Spore 400x.

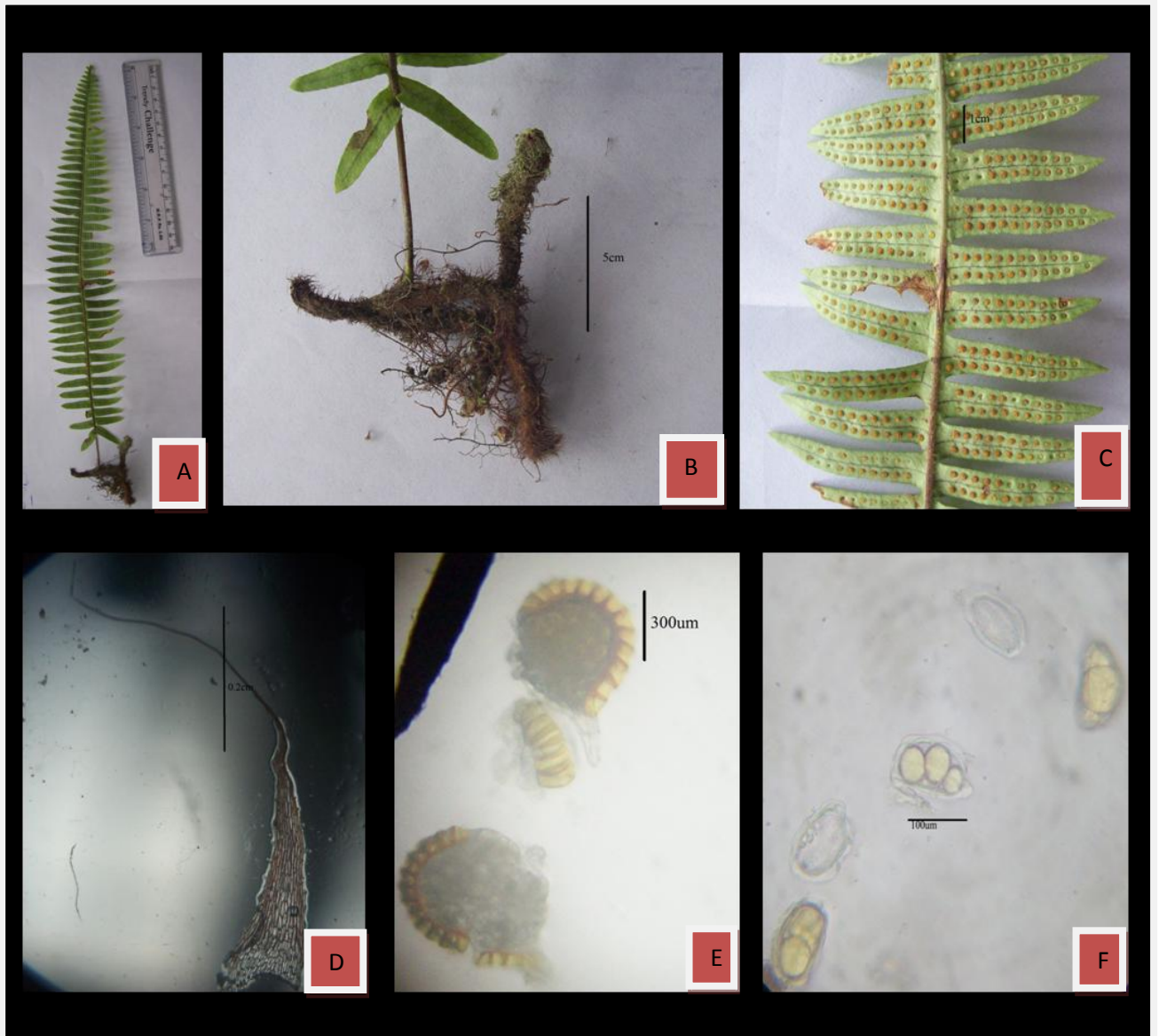


Plate 3.20:A. *Polypodiodes lachnopus* (Wallich ex Hooker)Ching; b. Rhizome scales; C. Segment with sori;D. Scales 20x; E. Sporangium 100x;F. Spore 400x.

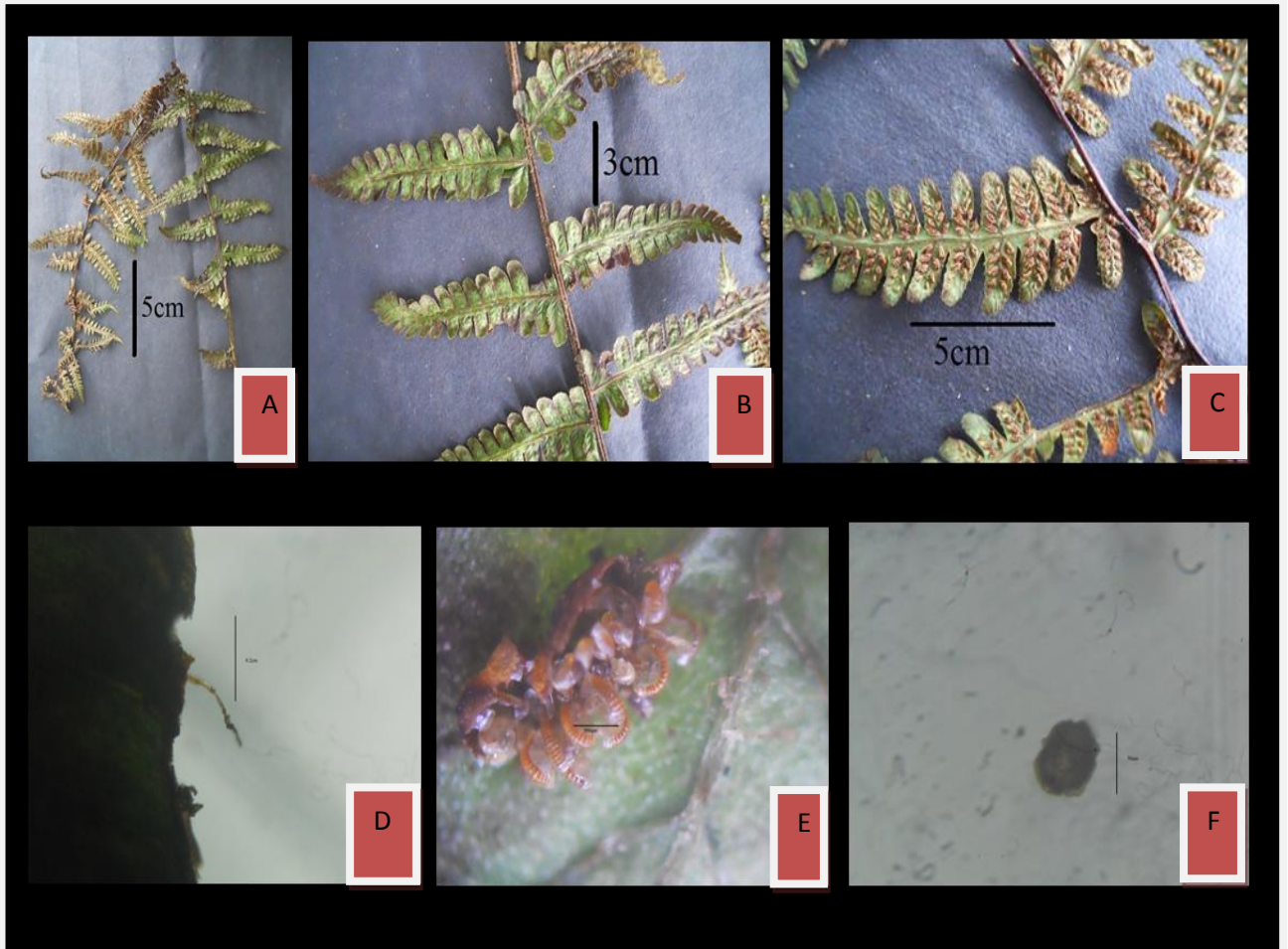


Plate 3.21:A. *Deparia allantodiodes* (Beddome)M.Kato ; B. Pinnae; C. Pinnae with sori; D. Hairs in segment; E. Sori 40x;F. Spore 400x.



Plate 3.22:A. *Asplenium ensiforme* Wallich ex Hooker & Greville ; B. *Goniophlebium argutum* (Wallich ex Hooker) Smith(Close to *G.metzense*); C.*Botrychium Lanuginosum* Wallich ex Hooker et Greville (Close to *B. Virginanum*); D. Anormal monomorphic frond of *Plagiogyra pycnophylla* (Kunze)Mettenius; E. Abnormal bifurcation in *Loxogramme involuta* M.g Price; F. Abnormal stobilus in *Equisetum arvense* Linnaeus subsp *diffusum* Fraser-Jenkins.

3.2.Result

The present studies revealed 206 species of fern and fern allies representing 70 genera and 26 families (Table 1) and predominantly consist of Eastern Himalayan species belonging to Sino-himalayan and Malesian elements. Three families from fern allies have been documented consisting of 5 genera with 17 species, where lycopodiaceae with 3 genera and 8 species have shown the highest diversity (Thapa *et al.* 2015).The highest diversity in terms of genera and number of species is shown by family Polypodiaceae with 13 genera and 40 species. Mehra & Bir, 1964 documented 31 families, 86 genera and 338 species from the Darjiling and Sikkim himalaya. On the contrary Hara, 1974 in his famous expedition to eastern Himalaya listed 131 species from darjiling hills. The recent systematic and new classification has however decreased the number of families, genera and species.

Majority of the fern species in Darjiling hills depending upon habit and habitat can be classified into different groups like epiphytes, lithophytes, mesophytes and climbers. The epiphytes and lithophytes form the major chunk of the pteridophytic flora for the region. Around 26.8% are epiphytes, lithophytes 44.11%, mesophyte account for 27.13% and 2% is represented by climbers. Four climbers chiefly *Lygodium japonicum*, *Lygodium salicifolium*, *Stenochlaena palustris* from the warmer foot hills and *Tricholepidium normale* from the cool temperate region has been found.

The new record for the region is *Botrychium lunaria*, a high altitude species collected from Sandhakphu (Thapa *et al.* 2014; Thapa and Lama, 2015) which forms a connecting link between the species of western Himalaya and far- north east India. Similarly the present worker discovered a *Pteris* sp at an altitude of 323 m in the foothills and identified as *Pteris austrosinica*, the species which was endemic to China (Thapa *et al.* 2015). Exotic and adventives species that have naturalized in Darjiling hills are *Adiantum concinnum* and *Pityrogramma calomelanos*. However numerous

ornamental has been introduced like *Davallia fijiensis*, Stag horn etc yet they haven't naturalized.

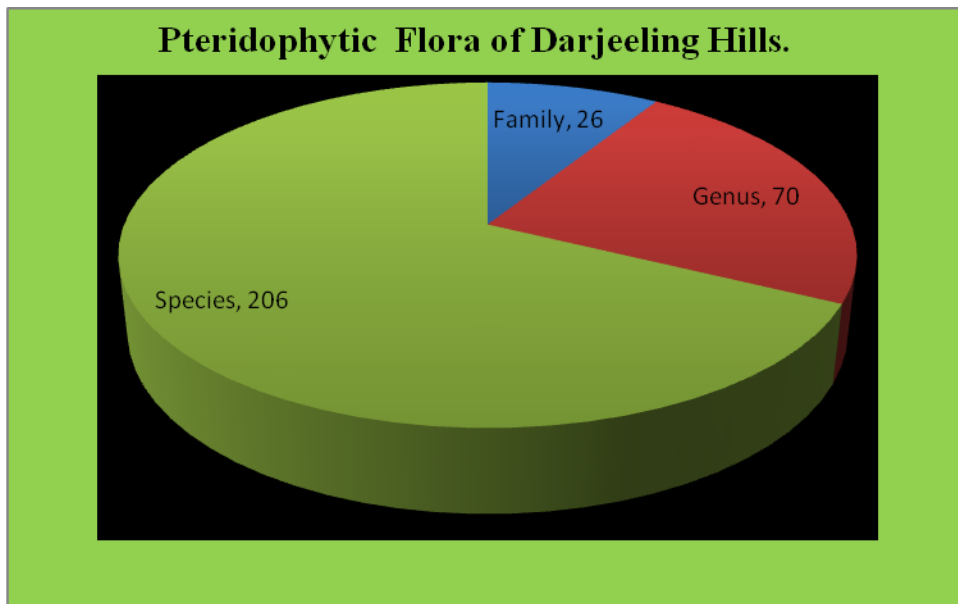


Figure 3.23 : Overall scenario of Pteridophytic flora Darjiling hills

Sl.No	Family	Genus	Species
1	Aspleniaceae	1	7
2	Blechnaceae	3	3
3	Cyatheaceae	1	2
4	Davallaceae	3	3
5	Dennstaedtiaceae	5	7
6	Dryopterideaceae	9	33
7	Equisetaceae	1	2
8	Gleichenaceae	2	4
9	Grammitadaceae	1	1
10	Hymenophyllaceae	2	4
11	Lindsaeaceae	2	3
12	Lomariopsidaceae	2	3
13	Lycopodiaceae	3	8
14	Lygodiaceae	1	2
15	Marattiaceae	1	1
16	Nephrolepidaceae	1	1
17	Oleandraceae	1	2
18	Ophioglossaceae	2	6

19	Osmundaceae	1	1
20	Plagiogyraceae	1	1
21	Polypodiaceae	13	40
22	Pterideaceae	7	31
23	Sellaginaceae	1	7
24	Thelypterideaceae	1	10
25	Vittariaceae	1	4
26	Woodsiaceae	4	20
Total	26	70	206

Table3.1: Family,Genus & Species of Pteridophytic flora.

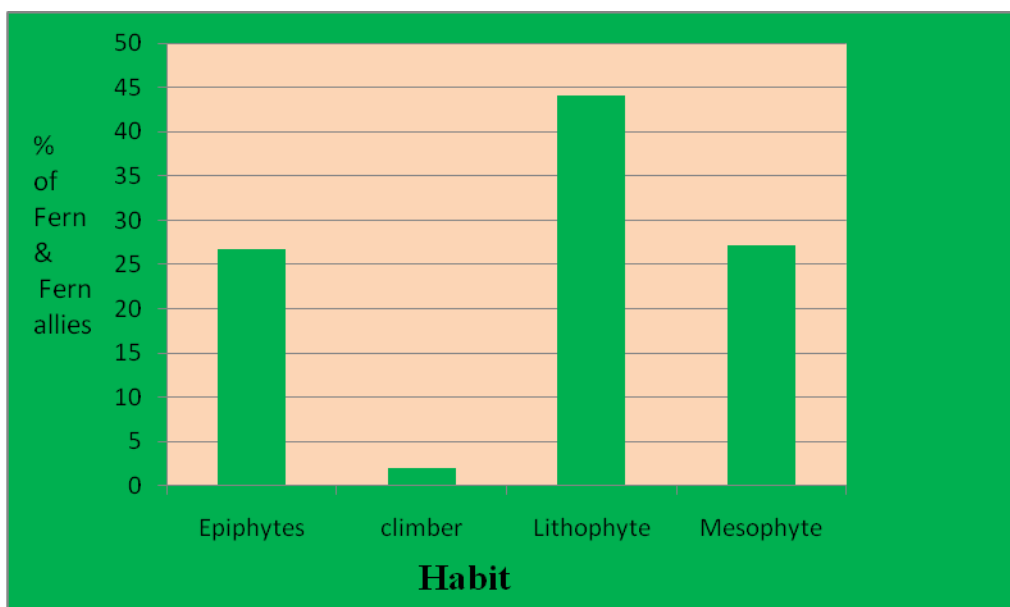


Fig 3.24: Graph representing Habit & % of Species.

Another remarkable finding of the present study was the abnormal specimen collected during the field survey. Abnormal specimen's of *Plagiogyra pycnophylla* having a monomorphic frond collected from three different location namely Ramam, Rechala and Senchel is quite fascinating i.e. Abnormality or speciation? If abnormality than what is it's triggering mechanism and if not, why not a speciation? Since abnormal specimen (Plate 3.22: A to F) have been collected by the present worker in different members of pteridophytes like *Asplenium ensiforme*, *Lepisorus mehra*,

Botrychium lanuginosum, *Equisteum arvense* subsp. *diffusum*, *Goniophlebium argutum* (Close to *G. metzense* {Thapa and lama, 2013}).

90% of the fern flora in Darjiling comprises of Sino –Himalayan and Malesian element. Some Malesian elements in the flora tend to be native to an area where temperature is usually high as for tropical and sub-tropical belt. Some important components of Malesian element in Darjiling hills confined to Foothills ranging in altitude of 300-1000 m are *Pteris biaurita*, *Microlepia rhomboidea*, *Microlepia speluncae*, *Bolbitis heteroclita* and *Stenochlaena palustris*. On the contrary Sino-himalayan elements prefer lower temperature, cool climatic condition and are restricted to temperate and sub-alpine region of Darjiling hills. The single species representing the Afro-Arabian connection migrated through Deccan in the foothills is *Aleuritopteris bicolor*.

The rarest of species collected from Darjiling hills at single location in this entire study are *Huperzia ceylanica* (Plate 3.1) and *Asplenium magnificum*. *Huperzia phlegmaria* couldn't be collected from the foothills is a matter of concern as previous literature indicates its presence. Similarly the dwindling population of *Cyathea sp* and its diversity at the present study revealed only two species. One-time collected species like *Pteris barbiger*, *Cyathea contaminans*, *Dipteris wallichii*, *Pteridrys cnemidaria*, *Christopteris tricupsis* could not be collected in the present study as well. *Pteris barbiger* is known only from one collection in Darjiling hills, after which it could not be seen in the wild neither be collected for 100 years.

3.3 Discussion

Floristically rich Darjiling hills is represented by pteridophytes which account to 206 species representing 70 genera and 26 families. The new record for the region are *Botrychium lunaria*, *Huperzia ceylanica* and *Pteris austrosinica*. The terrain complexity of the region and inaccessibility has lead to the new record for the region. As Darjiling hills is a segment of eastern himalaya the availability of the micro niche facilitates (Acharya & Acharya, 2003) the growth and development of species which are yet to be discovered. As for instance the *Botrychium lunaria* was collected from Sandhakphu (Singalila National Park) in the month of July 2014 when the national park is usually closed. The sub-alpine plants which has a short favourable growing condition are hard to be recorded due to numerous factor

which may be climatic as well as the government norms concerning the closure of parks during the breeding season. Similarly *Huperzia ceylanica* was collected from the fringes of National park in Chitrey whose population is very very small and conservation strategy should be implemented to safeguard this species.

Pteris austrosinica an endemic Chinese element was reorded from Tropical forest in Singla for the first time in Indian Sub-continent. However , debate arouse upon its name and its existence in china as well as in Darjiling hills (Fraser-Jenkins in Prep. Check-list of India, Part II).

The migration of temperate species towards the tropical region is quite common in angiosperm's, however such migration in ferns with respect to *Pteris wallichiana* descending the lower altitude has never been documented in Darjiling and Sikkim himalaya (Kholia, 2010). Contrary to descend the present worker highlighted the ascend of species to the cold temperate region from tropic's due to numerous factor, chief being the anthropogenic activity(Thapa *et al.*2014) .

The rarest of species collected from Darjiling hills at single location in this entire study is *Asplenium magnificum* collected from the streams of Gorkhey and this species is collected for second time from the region after R.C. Ching. The absence of *Huperzia phlegmaria* in the foothills of darjiling is a matter of concern as previous literature indicates its presence. However it's ornamental value and wide exploitation by local nursery and flower shop must be the reason for its disappearance. Similarly the dwindling population of *Cyathea sp* and its diversity as the present study revealed only two species which is due to over exploitation of species for its trunk to make a pot for growing the cymbidium hybrid by Local nursery and flower enthusiast. One-time collected species like *Pteris barbigera*, *Cyathea contaminans*, *Dipteris wallichii*, *Pteridrys cnemidaria* , *Christopteris tricupsis* could not be collected in the present study as well. This species tend to be rarest in the Indian sub-continent as well, as *Pteris barbigera* is known only from one collection in Darjiling hills, after which it could not be seen in the wild neither be collected for 100 years. Similarly the entire habitat of *Pteridrys cnemidaria* located in the valley of Great rangit in sumbong was washed away in flash flood of 1968. *Christopteris tricupsis* an epiphyte lost its

habitat too when the *Shorea robusta* trees were exploited in Goke for the timbers and their existence in darjiling hill is still unknown. *Dipteris wallichii* habitat was also entirely destructed once the Corporation, under forest department started clearing away the tress in Kalimpong. The reason for disappearance of *Cyathea contaminans* is basically for its trunk as it was used to prepare pots and its young tender croizer used as a delicacy by locals.

3.4 Conclusion

The study in Darjiling hills revealed a rich diversity of Pteridohytes along the altitudinal gradient from plains up to the sub-alpine region. 206 species of fern and fern allies representing 70 genera and 26 families has been documented. The highest diversity in terms of genera and number of species is shown by family Polypodiaceae with 13 genera and 40 species. This region chiefly consist of sino-himalayan and malesian element in pteridohytic flora. The new record for the region are *Botrychium lunaria*, *Huperzia ceylanica* and *Pteris austrosinica*. The one time collected species from the region couldn't be collected in the present study as well and their loss from the region is an effect of habitat destruction. Conservation measure should be implemented to safeguard some rarest species like *Asplenium magnificum* and *Huperzia ceylanica* which may be lost due to anthropogenic activity. The survey failed to record *Huperzia phlegmeria* from the foothills which may be due to over exploitation of the species for ornamental purposes. One-time collected species like *Pteris barbiger*, *Cyathea contaminans*, *Dipteris wallichii*, *Pteridrys cnemidaria*, *Christopteris tricupsis* could not be collected in the present study as well. Numerous abnormal specimen were encounterd in the study which has been documented and further research in molecular level is necessary to unearthed its hidden mystery.

3.5 Summary

The present study was undertaken in different forest tract of darjiling hill for enumeration of fern and fern allies. The District of Darjiling excluding the plains of siliguri and duars was the study area. The study area ranged in altitudinal variation from 150 m amsl to 3660m amsl covering chiefly 4 climatic zone i.e. tropical, sub-tropical, temperate and sub-alpine. The enumeration of pteridophytic flora was carried out and placed in respective families. The family keys has been provided in the first page of the chapter. 26 families has been documented in the present study with total of 70 genus

and 206 species. Three families from fern allies have been documented consisting of 5 genera with 17 species, where Lycopodiaceae with 3 genera and 8 species have shown the highest diversity (Thapa et al, 2015). The highest diversity in terms of genera and number of species is shown by family Polypodiaceae with 13 genera and 40 species. Mehra & Bir, 1964 documented 31 families, 86 genera and 338 species from the Darjiling and Sikkim Himalaya. On the contrary Hara, 1974 in his famous expedition to eastern Himalaya listed 131 species from Darjiling hills.

Majority of the fern species in Darjiling hills depending upon habit and habitat can be classified into different groups like epiphytes, lithophytes, mesophytes and climbers. The epiphytes and lithophytes form the major chunk of the pteridophytic flora for the region. Around 26.8% are epiphytes, lithophytes 44.11%, mesophytes account for 27.13% and 2% is represented by climbers. Four climbers chiefly *Lygodium japonicum*, *Lygodium salicifolium*, *Stenochlaena palustris* from the warmer foot hills and *Tricholepidium normale* from the cool temperate region has been found.

The new record for the region is *Botrychium lunaria*, a high altitude species collected from Sandhakphu (Thapa et al. 2014) which forms a connecting link between the species of western Himalaya and far-north east India. The present study recorded an endemic species of China for the first time in Indian sub-continent at an altitude of 323 m in the foothills which was *Pteris austrosinica* (Thapa & Lama, 2014). Exotic and adventive species that have naturalized in Darjiling hills are *Adiantum concinnum* and *Pityrogramma calomelanos*. However numerous ornamentals have been introduced like *Davallia fijiensis*, Stag horn etc yet they haven't naturalized.

Abnormality of species has been observed in the present study where abnormal specimen's of *Plagiogyra pycnophylla* having a monomorphic frond was collected from three different locations namely Ramam, Rechala and Senchel. The observation of such specimen was fascinating i.e. Abnormality or speciation? If abnormality then what is its triggering mechanism and if not, why not a speciation? And the finding of several specimens from different locations occupying different ecological niches and each species showing the same peculiarity needs further study. Since abnormal specimens have been collected by the present worker in different members of pteridophytes like *Asplenium ensiforme*, *Lepisorus mehra*,

Botrychium lanuginosum, *Equisteum arvense* subsp. *diffusum*,
Goniophlebium argutum (Thapa et al. 2013).

90% of the fern flora in Darjiling comprises of Sino –Himalayan and Malesian element. Some Malesian elements in the flora tend to be native to an area where temperature is usually high as for tropical and sub-tropical belt. Some important components of Malesian element in Darjiling hills confined to Foothills ranging in altitude of 300-1000 m are *Pteris biaurita*, *Microlepia rhomboidea*, *Microlepia speluncae*, *Bolbitis heteroclita* and *Stenochlaena palustris*. On the contrary Sino-himalayan elements prefer lower temperature, cool climatic condition and are restricted to temperate and sub-alpine region of Darjiling hills. The single species representing the afro-arabian connection migrated through Deccan in the foothills is *Aleuritopteris bicolor*.

The rarest of species collected from darjiling hills at single location in this entire study are *Huperzia ceylanica* and *Asplenium magnificum*. The absence of *Huperzia phlegmaria* in the foothills of darjiling is a matter of concern as previous literature indicates its presence. However it's ornamental value and wide exploitation by local nursery and flower shop must be the reason for its disappearance in the study area. Similarly the dwindling population of *Cyathea sp* and its diversity as the present study revealed only two species which is due to over exploitation of species for its trunk to make a pot for growing the cymbidium hybrid by Local nursery and flower enthusiast. One-time collected species like *Pteris barbiger*, *Cyathea contaminans*, *Dipteris wallichii*, *Pteridrys cnemidaria*, *Christopteris tricupsis* could not be collected in the present study as well. This species tend to be rarest in the Indian sub-continent as well, as *Pteris barbiger* is known only from one collection in Darjiling hills, after which it could not be seen in the wild neither be collected for 100 years. Similarly the entire habitat of *Pteridrys cnemidaria* located in the valley of Great rangit in sumbong was washed away in flash flood of 1968. *Christopteris tricupsis* an epiphyte lost its habitat too when the *Shorea robusta* trees were exploited in Goke for the timbers and their existence in darjiling hill is still unknown. *Dipteris wallichii* habitat was also entirely destructed once the Corporation, under forest department started clearing away the tress in Kalimpong. The reason for disappearance of *Cyathea contaminans* is basically for its trunk used to prepare pots and its young tender croizer used as a delicacy by locals.