Diversity of Ferns and Lycophytes of Pergau Dam, Kelantan and its Vicinity

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Abstract. Ferns and lycophytes were opportunistically collected along the major trail at Gunung Basor Forest Reserve near Pergau Dam, Kelantan. Samples were curated, identified and deposited at Universiti Kebangsaan Malaysia Herbarium (UKMB). From the sampling area, a total of 94 taxa of ferns and lycophytes in 55 genera and 29 families were identified. This figure represents 8.07% of the total 1165 taxa of ferns and lycophytes in Malaysia and 14.52% of 647 taxa recorded in Semenanjung Malaysia. Polypodiaceae is the largest family recorded with 11 species in eight genera. The second largest family is Aspleniaceae with 10 species in a single genus. This is followed by the family Grammitidaceae with eight species in six genera. The most widely recorded species is from the genus Asplenium. The smallest families with one species each are Blechnaceae, Cyatheaceae, Gleichiniaceae, Marattiaceae, Matoniaceae, Oleandraceae, Ophioglossaceae, Psilotaceae, Pteridaceae and Sinopteridaceae. From the 94 taxa reported, terrestrial species are the most dominant with ca. 53 species covering 56.0% and followed by epiphytic species (33%) and litoiphyte species (10.6%).

1. Introduction
Ferns studies in Kelantan was pioneered by Richard Eric Holttum in 1950. He recorded four taxa of ferns (*Schizaea malaccana*, *Abrodictyum idoneum*, *Hypodematum glabrius* and *Lindsaea napea*) in his book ‘*Revision of Flora of Malaya, Volume 2, Ferns’* [1]). After nearly two decades later, Wong Kong Meng added, five species of lycophytes from Selaginellaceae in Kelantan [2] followed by Rusea et al. [3] who encountered a new fern species, *Tectaria guachana* in Gua Cha.

A series of scientific expeditions were later carried out in Kelantan organized by The Forestry Department of Peninsular Malaysia (JPSM). This included fern studies accomplished by Maideen et al. [4], Ruzi et al. [5], Jaman et al. [6] and recently by Maideen et al. [7]. In 2005, Maideen et al. recorded 83 taxa of ferns in Gunung Stong State Park. Two years later, a study made by Ruzi et al. [5] found 41 taxa of ferns in the vicinity of Lojing Highlands. A total of 132 taxa of ferns were recorded in Gunung Chamah and its vicinity by Jaman et al. [6]. Recently, Maideen et al. [7] reported a total of 55 species in 33 genera and 21 families in Ulu Sat Forest Reserve. This study aimed to report the fern diversity in Pergau Dam area and its vicinity in Gunung Basor Forest Reserve.

2. Materials and Methods
All specimens were collected during five days in Tasik Pergau Scientific Expedition at Kelantan from 8th December until 14th December 2012. The study site was in Compartment 39, Gunung Basor Forest Reserve (GBFR), Pergau Dam, Batu Melintang in Jeli, Kelantan. Ferns was collected along five trails
that had been provided by the organizer which were Gunung Basor trail, Gunung Reng trail, Hotspring, Sungai Long and Renyut Intake 1 trails. All specimens collected were curated and identified using identification key provided in books and journals such as Cobb [8], Copeland [9], Holttum [1,10], Parris et al. [11,12] and Tagawa and Iwatsuki [13,14,15,16]. All these specimens were kept in Herbarium Universiti Kebangsaan Malaysia (UKMB).

3. Results and Discussion
A total of 94 taxa of ferns in 55 genera and 29 families were recorded in Pergau Dam, GBFR and its vicinity. This included 12 taxa (10 species and two varieties) of lycophytes and 82 taxa (80 species and two varieties) of monilophytes (Appendix 1). This represented 14.52% out of 647 taxa in Peninsular Malaysia and 8.07% out of the overall ferns reported in Malaysia [17]. Polypodiaceae is the biggest family with 11 species in eight genera followed by Aspleniaceae with 10 species in a single genus Asplenium and Grammitidaceae with eight species in six genera. Meanwhile Blechnaceae, Cyatheaceae, Gleicheniaceae, Marattiaceae, Matoniaceae, Ophioglossaceae, Psilotaceae, Pteridaceae and Sinopteridaceae with only single taxa respectively.

Epiphytes ferns was the most dominant with 31 species recorded which represented 33.0% of the total ferns recorded followed by terrestrial ferns in open area with 29 species (25%) and litophytes with 10 species (11%) as in Figure 1. The epiphytes ferns encountered includes Belvisia spicata, Dasygrammitis mollicoma, Asplenium phyllitidis and Antrophyum callifolium meanwhile Dicranopteris linearis var. linearis was found in abundance in open places especially near cliffs in hills along with Cyathea contamminans and Plagiogyria adnata.

Some of the ferns found growing in shady area includes Diplazium accedens, Pronephrium triphyllum and Pleocnemia irregularis while Antrophyum callifolium and Microsorum membranifolium were lithophytic ferns found growing on rocks. The leaves of these plants are usually small to moderate in size and their roots are usually tough to enable it to clasp on the rocks to withstand the plant drowning during heavy rains [18].

Fern distribution in this study varies with altitude and this is reflected in ferns collected along the Gunung Basor trail. At the beginning of the trail, there was a dam about 650 m asl. The surrounding area was shaded as it was covered by big-sized trees. Aspleniaceae and Polypodiaceae were the most dominant families with their species found either growing on trees or rocks. As the altitude increases to about 1067 m a.s.l. most of the ferns found were species of Lindsaeaceae (for example Lindsaea odorata and Tapeinidium serratum), Tectaria singapureana, Nephrolepis davallioides and Diplazium cordifolium. Along the trail to the summit, ferns such as Lecanopteris pumila, Oleandra neriiformis, Matonia pectinata, Selliguea subsparsa, Cheiropleuria bicuspis, Huperzia phlegmaria, Oreogrammitis malayensis and O. reinwardtii were recorded. These species were commonly found in high altitudes.

In Hotspring and Gunung Reng trails, some of the ferns encountered includes Pleocnemia irregularis, Angiopteris evecta, Bolbitis heteroclita, Helminthostachys zeylanica and Selaginella wildenowii meanwhile in trails of Sungai Long and Renyut Intake 1, species such as Diplazium accedens, Plagiogyra adnata and Cyathea contamminans were found. All of these species were commonly found in lowland forest. The present study highlights the need for more botanical collection in this area. As ferns and lycophytes are sensitive to environmental changes, the knowledge of floristic diversity is important to support conservation planning in the area.
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Appendix 1

Figure 1. Diversity of Ferns and Lycophytes
List of ferns in Pergau Dam, GBFR and its vicinity. Arrangement following Parris [19].

**LYCOPHYTA**

**LYCOPODIACEAE**

*Huperzia carinata* (Desv. ex Poir.) Trevis
Epiphyte and lithophyte. Mount Basor (GB); alt 713m; Fatin, Ab Rashid & Masnoryante; FS58, FS8; 10/12/12 (UKMB)

*Huperzia phlegmaria* (L.) Rothm
Epiphyte. GB, Fatin, Ab Rashid & Masnoryante, 11/12/12, FS58, FS85

*Huperzia serrata* (Thunb. ex Murray) Trevis
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS64; 11/12/12 (UKMB)

*Lycopodiella cernua* (L.) Pic. Serm.
Terrestrial, grows in open and semi-open area. GB, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS47, FS129; 11/12/12, 13/12/12 (UKMB)

**SELAGINELLACEAE**

*Selaginella intermedia var. dolichocentrus* K.M Wong
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS48, FS54, FS76; 11/12/12 (UKMB)

*Selaginella intermedia* (Blume) Spring
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS42, FS46, FS67, FS78; 11/12/12 (UKMB)

*Selaginella minutifolia* Spring
Litophyte, in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS43, FS81; 10/12/12, 11/12/12 (UKMB)

*Selaginella ornata* (Hook. & Grev.) Spring
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS71, FS73; 11/12/12 (UKMB)

*Selaginella rivalis* Ridl.
Terrestrial in shady area. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS124, FS125, FS141, FS142, FS143; 13/12/12 (UKMB)

*Selaginella roxburghii* (Hk. & Gr.) Spring
Terrestrial in shady area. GB, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS72; 11/12/12 (UKMB)

*Selaginella wallichii* (Hook. & Grev.) Spring
Terrestrial in shady area. GB, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS01, FS139; 10/12/12, 13/12/12 (UKMB)

*Selaginella wildei* (Desv. Ex Poir.) Baker
Terrestrial in shady area. GB, Hotsping, Gunung Reng, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS61, FS104, FS108, FS114, FS117, FS120; 11/12/12, 12/12/12, 13/12/12 (UKMB).

**FERNS (MONILOPHYTA)**

**ADIANTACEAE**

*Adiantum caudatum* Linn.
Terrestrial in shady area. GB, Fatin, Ab Rashid & Masnoryante; FS56; 11/12/12 (UKMB)

*Adiantum latifolium* Lam.
Terrestrial in semi-shaded area. Hotsping; Fatin, Ab Rashid & Masnoryante; FS112; 12/12/12 (UKMB).

*Anthrophyum callifolium* Blume
Epiphyte in lowland. GB; Fatin, Ab Rashid & Masnoryante; FS15; 10/12/12 (UKMB)

*Haplopteris angustifolia* Blume
Epiphyte in higlands, shady area. GB, Fatin, Ab Rashid & Masnoryante; FS14; 10/12/12 (UKMB).

**ASPLENIACEAE**

*Asplenium caudatum* G. Forst.
Epiphyte and terrestrial in mountains, shady area. GB, Fatin, Ab Rashid & Masnoryante; FS75; 11/12/12 (UKMB).

*Asplenium latifolium* Lam.
Terrestrial in semi-shaded area. Hotsping; Fatin, Ab Rashid & Masnoryante; FS112; 12/12/12 (UKMB).

*Asplenium longissimum* Blume
Terrestrial in semi-shaded area. GB, Fatin, Ab Rashid & Masnoryante; FS28, FS53; 10/12/12, 11/12/12 (UKMB)

*Asplenium nidus* L.
Epiphyte, in semi-shaded area. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS131; 13/12/12 (UKMB)

*Asplenium normale* Don.
Terrestrial in shady area. GB, Fatin, Ab Rashid & Masnoryante; FS09, FS84; 10/12/12, 11/12/12 (UKMB)
Asplenium pellucidum Lam.
Litophyte, semi-shaded area. GB, Fatin, Ab Rashid & Masnoryante; FS70; 11/12/12 (UKMB)

Asplenium phyllitis D. Don ssp. malesicum
Epiphyte. GB, Fatin, Ab Rashid & Masnoryante; FS13; 10/12/12 (UKMB)

Asplenium salignum Blume
Epiphyte or litophyte, semi-shaded area. GB, Fatin, Ab Rashid & Masnoryante; FS50, FS51, FS52; 11/12/12 (UKMB)

Asplenium scolopendrioides J. Sm.
Epiphyte in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS16; 11/12/12 (UKMB)

Asplenium scortechinii Bedd.
Epiphyte in shady area. GB, Fatin, Ab Rashid & Masnoryante; FS69; 10/12/12 (UKMB)

BLECHNACEAE
Blechnum orientale L.
Terrestrial. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS133; 13/12/12 (UKMB).

CYATHEACEAE
Cyathea hymenodes Mett.
Terrestrial in open area. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante, FS137; 13/12/12 (UKMB)

DAVALLIACEAE
Davallia denticulata (Burm. f.) Mett. ex Kuhn.,
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS21; 10/12/12 (UKMB)

Davallia dimorpha Holttum
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS30; 10/12/12 (UKMB)

Davallia repens (L. f.) Kuhn.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS100; 11/12/12 (UKMB).

DIPTERIDACEAE
Dipteris conjugata Reinw.
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS91; 11/12/12 (UKMB)

Cheiropleuria bicuspis (Bl.) C. Presl
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS61; 11/12/12 (UKMB)

DRYOPTERIDACEAE
Bolbitis heteroclita (C. Presl) Ching
Epiphyte. near river bank. Hotspring, Fatin, Ab Rashid & Masnoryante; FS107; 12/12/12 (UKMB)

Elaphoglossum callifolium (Blume) T. Moore
Epiphyte in mountains, shady area. GB; Fatin, Ab Rashid & Masnoryante; FS63; 11/12/12 (UKMB)

GLEICHINIACEAE
Dicranopteris linearis (Burm. f.) Underw. var. linearis
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS24; 10/12/12 (UKMB)

GRAMMITIDACEAE
Ctenopterella blechnoides (Grev.) Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS83; 11/12/12 (UKMB)

Dasygrammitis brevivenosa (Alderw.) Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS80; 11/12/12, (UKMB)

Dasygrammitis mollicoma (Nees & Blume) Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS98; 11/12/12 (UKMB).

Oreogrammitis malayensis Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS92; 11/12/12 (UKMB).

Oreogrammitis reinwardtii (Blume) Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS82, FS84; 11/12/12 (UKMB).

Prosaptia obliquata (Blume) Mett.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS92; 11/12/12 (UKMB).

Sceleroglossum pusillum (Blume) Alderw.,
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS72, FS89, FS91, FS97; 11/12/12 (UKMB)

Xiphopterella sparsipilosa (Holtum) Parris
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS85, FS86, FS93, FS96; 11/12/12 (UKMB)
HYMENOPHYLLACEAE

Hymenophyllum javanicum Spreng.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS04; 10/12/12 (UKMB).
Hymenophyllum polyanthus Swartz.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS77; 11/12/12 (UKMB)

Trichomanes aplebioides Chr.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS57, FS79, FS84; 11/12/12 (UKMB).
Trichomanes auriculatum Blume
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS90; 11/12/12 (UKMB).
Trichomanes digitatum Swartz
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS94; 11/12/12 (UKMB).
Trichomanes meifolium Bory ex Willd.
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS70; 11/12/12 (UKMB).

HYPODEMITIACEAE

Didymochlaena truncatula (Sw.) J. Sm.
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS29; 10/12/12 (UKMB).

LINDSEAEACEAE

Lindsaea bouillodii H. Christ
Terrestrial in open area, near river bank. GB; Fatin, Ab Rashid & Masnoryante; FS29; 10/12/12 (UKMB)
Lindsaea cultrata (Willd.) Sw.
Terrestrial in open area, lowland. GB; Fatin, Ab Rashid & Masnoryante; FS31; 10/12/12 (UKMB)
Lindsaea decomposita Willd.
Terrestrial in open area, near river bank. GB; Fatin, Ab Rashid & Masnoryante; FS68; 11/12/12 (UKMB)
Lindsaea nitida Copel.
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS66; 10/12/12 (UKMB)
Tapeinidium pinnatum (Cav.) C. Chr.
Terrestrial in shady area, near river bank. GB; Fatin, Ab Rashid & Masnoryante; FS29; 10/12/12 (UKMB)

LOXOGRAMMIACEAE

Loxogramme avenia (Blume) C.Presl
Epiphyte. GB, Fatin, Ab Rashid, Masnoryante, 10/12/12, FS17, FS33 (UKMB)
Loxogramme scolopendrioides (Gaudich.) C.V.Morton
Epiphyte. GB, Fatin, Ab Rashid, Masnoryante, 10/12/12, FS13 (UKMB).

MARATTIACEAE

Angiopteris evecta (G. Forst.) Hoffm.
Terrestrial in shady area, near river bank. GB, Hotspring; Fatin, Ab Rashid & Masnoryante; FS17, FS119; 10/12/12, 12/12/12 (UKMB)

MATONIACEAE

Matonia pectinata R. Br.
Terrestrial in semi-shaded area. GB; Fatin, Ab Rashid & Masnoryante; FS77; 11/12/12 (UKMB)

NEPHROLEPIDACEAE

Nephrolepis biserrata (Sw.) Schott
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS22; 10/12/12 (UKMB)
Nephrolepis davalliioides (Sw.) Kunze
Epiphyte in mountain. GB; Fatin, Ab Rashid & Masnoryante; FS32; 10/12/12 (UKMB).

OLEANDRACEAE

Oleandra neriiformis Cav.
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS86; 11/12/12(UKMB)

OPHIOGLOSSACEAE

Helminthostachys zeylanica (L.) Hook.
Terrestrial in semi shaded area. Hotspring, Fatin, Ab Rashid & Masnoryante; FS118; 12/12/12 (UKMB)

PLAGIODRACIACEAE

Plagiogyria adnata (Bl.) Bedd.
Terrestrial in semi shaded area. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS138; 13/12/12 (UKMB)
Plagiogyria tuberculata Copel.
Terrestrial in semi shaded area. GB; Fatin, Ab Rashid & Masnoryante; FS55; 11/12/12 (UKMB)

POLYPODIACEAE

Plagiogyria adnata (Bl.) Bedd.
Terrestrial in semi shaded area. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS138; 13/12/12 (UKMB)
Plagiogyria tuberculata Copel.
Terrestrial in semi shaded area. GB; Fatin, Ab Rashid & Masnoryante; FS55; 11/12/12 (UKMB)
**Belvisia spicata** (L. f.) Copel.  
Epiphyte. Hotspring; Fatin, Ab Rashid & Masnoryante; FS05, FS19; 12/12/12 (UKMB)

**Lecanopteris pumila** (Blume) Holttum  
Epiphyte. GB, Fatin, Ab Rashid, Masnoryante, 11/12/12, FS67 (UKMB)

**Lemmaphyllum accedens** (Blume) Donk  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS11; 10/12/12 (UKMB)

**Lepisorus longifolius** (Blume) Holttum  
Epiphyte. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS135; 13/12/12 (UKMB)

**Microsorum membranifolium** (R. Br.) Ching  
Grows in between rocks or plants. Hotspring; Fatin, Ab Rashid & Masnoryante; FS115; 12/12/12 (UKMB)

**Microsorum punctatum** (L.) Copel.  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS12; 10/12/12 (UKMB)

**Microsorum scolopendria** (Burm.f.) Pic.Serm.  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS20; 10/12/12 (UKMB)

**Microsorum superficiale** (Blume) Ching  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS12; 10/12/12 (UKMB)

**Pyrrosia lanceolata** (L.) Farw.  
Epiphyte. Hotspring, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS106, FS144; 12/12/12, 13/12/12 (UKMB)

**Selliguea subsparsa** (Baker) Hovenkamp  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS75; 11/12/12 (UKMB)

**Thylacopteris papillosa** (Blume) J. Sm.  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS76; 11/12/12 (UKMB)

**PSILOTACEAE**

**Psilotum nudum** (L.) Beauv.  
Epiphyte. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS140 13/12/12 (UKMB)

**PTERIDACEAE**

**Taenitis blechnoides** (Willd.) Sw.  
Terrestrial in semi shaded area. GB; Fatin, Ab Rashid & Masnoryante; FS57; 11/12/12 (UKMB)

**SCHIZAEEACEAE**

**Actinostachys wagneri** (Selling) C.F.Reed  
Epiphyte. GB; Fatin, Ab Rashid & Masnoryante; FS44; 10/12/12 (UKMB)

**Schizaea malaccana** Baker var. malaccana  
Terrestrial in semi shaded area, near river bank. GB; Fatin, Ab Rashid & Masnoryante; FS101; 11/12/12 (UKMB)

**SINOPTERIDACEAE**

**Pityrogramma calomelanos** (L.) Link  
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS105, FS133; 11/12/12 (UKMB)

**TECTARIACEAE**

**Pleocnemia irregularis** (C. Presl) Holttum  
Terrestrial, in shady area. Hotspring; Fatin, Ab Rashid & Masnoryante; FS111; 12/12/12 (UKMB)

**Tectaria singaporiana** (Wall. ex Hook. & Grev) Copel.  
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS25; 10/12/12 (UKMB)

**THELYPTERIDACEAE**

**Christella dentata** (Forssk.) Brownsey & Jermy  
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS49; 10/12/12 (UKMB)

**Cyclosorus ferox** (Blume) Ching  
Terrestrial in open area. GB, Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS02, FS145; 10/12/12, 13/12/12 (UKMB)

**Cyclosorus subelata** (Baker) Ching  
Terrestrial in open area. Hotspring; Fatin, Ab Rashid & Masnoryante; FS109; 12/12/12 (UKMB)

**Mesophlebion crassifolium** (Blume) Holttum  
Terrestrial in shady area, near cliff. Renyut Intake 1; Fatin, Ab Rashid & Masnoryante; FS126; 13/12/12 (UKMB)

**Metaelypterus singalanensis** (Bak.) Ching  
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS23; 10/12/12 (UKMB)
Pronephrium triphyllum (Sw.) Holttum
Terrestrial in open area. GB; Fatin, Ab Rashid & Masnoryante; FS35; 10/12/12 (UKMB)

Thelypteris ciliata (Wall.) Ching
Terrestrial in shady area, near river bank. GB; Fatin, Ab Rashid & Masnoryante; FS38; 10/12/12 (UKMB)

WOODSIACEAE

Diplazium accedens Blume
Terrestrial, in shady area, Sungai Long; Fatin, Ab Rashid & Masnoryante; FS146; 13/12/12 (UKMB)

Diplazium cordifolium (Bl.) Copel.
Terrestrial in shady area. GB; Fatin, Ab Rashid & Masnoryante; FS54; 10/12/12 (UKMB)