

Pteridophyte Flora of Huai Yang Waterfall National Park, Prachuap Khiri Khan Province, Thailand

YUTTAYA YUYEN¹ AND THAWEESAKDI BOONKERD^{2*}

¹ *Department of Apply Biology, Faculty of Science and Technology, Ratchabhat Institute Ubon Ratchathani,
Ubon Ratchathani 34000, THAILAND*

² *Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok 10330, THAILAND*

ABSTRACT.—A total of 128 species of ferns and fern allies belonging to 63 genera and 26 families were recorded from Huai Yang Waterfall National Park, Prachuap Khiri Khan Province. This is the first report for the area which includes 11 species in 4 genera from 3 families of fern allies. Three families of true fern, namely Polypodiaceae, Aspleniaceae and Thelypteridaceae are among the common families. Polypodiaceae included 28 species in 15 genera. Whilst Aspleniaceae and Thelypteridaceae included 11 and 10 species, respectively. The study area is 161 km² and the elevation ranges from 100-1,250 m. The vegetation is divided among Dry Evergreen Forest, Mixed Deciduous Forest, Tropical Evergreen Forest, and Hill Evergreen Forest. It was found that Hill Evergreen Forest has the highest number of pteridophyte species. The collected specimens have produced new information on pteridophyte distribution of the Malesian elements. The overall pteridophyte number in the national park represents about 20% of the total in Thailand.

KEY WORDS: Pteridophyte; Ferns and Fern Allies; Prachuap Khiri Khan Province; Checklist; Thailand

INTRODUCTION

Huai Yang Waterfall National Park is located at the narrowest point of the country, in Tub Sakae and Bang Saphan District, Prachuap Khiri Khan Province. Geographically, this area is probably the transitional zone from south-western floristic region to the Malay Peninsula. Khao Luang, one of the tall peaks in the Tanao Sri Mountain Range, is also an interesting location to explore pteridophyte diversity. After reviewing the literature, it was found that the

plant diversity of the western floristic region is not as frequently investigated compared to other parts of the country. However, some botanical expeditions were made in Kanchanaburi Province, but these mainly focused on flowering plants. Therefore, the knowledge on pteridophyte diversity in this region is rather limited. Consequently, botanical surveys of pteridophyte diversity in this region are necessary to gain more knowledge on species diversity as well as their geographical distribution.

Tagawa and Iwatsuki (1979-1989), Japanese botanists from Kyoto University, studied the herbarium specimens of pteridophytes collected from Thailand and from their own field trips. A total of 633 species, in 132 genera from 34 families of pteridophytes were enumerated. They

* Corresponding author.

Tel: (662) 218-5503

Fax: (662) 252-8979

E-mail: Thaweesakdi.B@chula.ac.th

found 25 new species, and 21 of these species were endemic to Thailand. It was also mentioned 19 species of pteridophytes collected from Huai Yang Waterfall National Park, Prachuap Khiri Khan Province (Tagawa and Iwatsuki, 1979; 1985; 1988; 1989).

This work is aimed at conducting a botanical inventory of pteridophytes at Huai Yang Waterfall National Park, Prachuap Khiri Khan Province.

STUDY SITE

Huai Yang Waterfall National Park is located in the Tanao Sri Range, south of the narrowest part of Thailand, and covers an area of approximately 161 km². The park occupies Huai Yang, Khao Lan, Sang Arun, Na Hu Kwang and Ang Thong subdistricts in Tubsakae District and Chaikasame subdistrict in Bang Saphan District, Prachuap Khiri Khan Province (Fig. 1). It is approximately marked out by the geographical coordinates of 11°37'-11°41'N and 99°24'-99°37'E. It is bounded on the north by Hin Chaung Canal in Huai Yang subdistrict, Tubsakae District; on the south by Morasuap Canal in Chaikasame subdistrict, Bang Saphan District; on the east by Tubsakae Reserve Forest, Tubsakae District and Bang Saphan District; and on the west by the Union of Myanmar (Plerdpling, 2000).

The park ranges in elevation from 100 to 1,250 m at the summit of Khao Luang. Most of the park is mountainous and plain areas are observed only in the valley. Generally, the mountain slopes in the park are about 10-30% (Plerdpling, 2000). Khao Luang is also located in a watershed and streams flow into waterfalls such as Huai Yang Waterfall, and Bua Sawan Waterfall.

Huai Yang Waterfall National Park is mostly composed of granitic rocks and granodiorite, which cover an area of 130 km² or nearly 81% of the park area. An area covering 7.4 km² or about 5% of the park, is composed of gneiss and schist. Rocks in some areas belong to rocks of the Tanao Sri group, such as the Kaeng Kra-

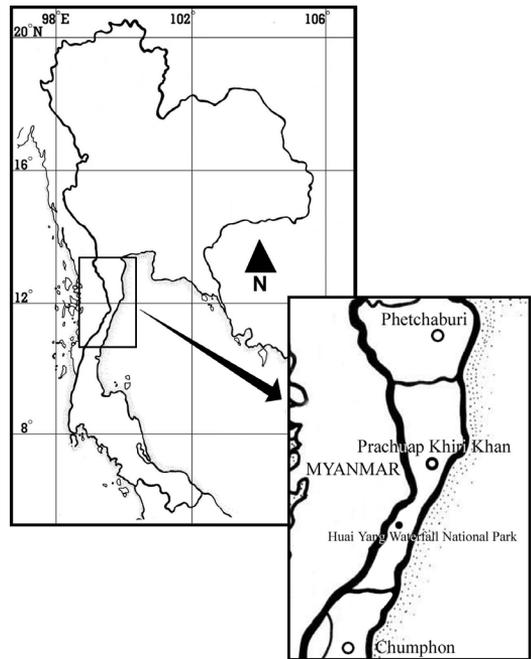


FIGURE 1. Maps showing the location of Huai Yang Waterfall National Park.

chan Formation. This area is about 14.6 km² or approximately 9% of the whole park area. A slope complex mainly consists of composite granite, limestone and sandstone. It covers an area of 150 km² -- approximately 93.5% of the whole area. Soil types in this area are soil of the Thungwa alkaline variant, soil of the Khlong Nok Krathung alkaline variant, and soils of the Bang Saphan series (Plerdpling, 2000).

The climate of the area is a Tropical Savannah Climate, with average high temperatures year round and a distinct dry season. Three seasons were observed, i.e. the rainy season during May-November; the winter season during December-February, and the summer season during March-April (Meteorological Department, 2000). The Prachuap Khiri Khan Climatic Station in Mueang District is the nearest station. The climatological data¹ during 1970-2000 shows the average annual temperature of 27.1°C. The

¹ The climatological data during 1970-2000 is probably rather drier and hotter than the average for the park as a whole.

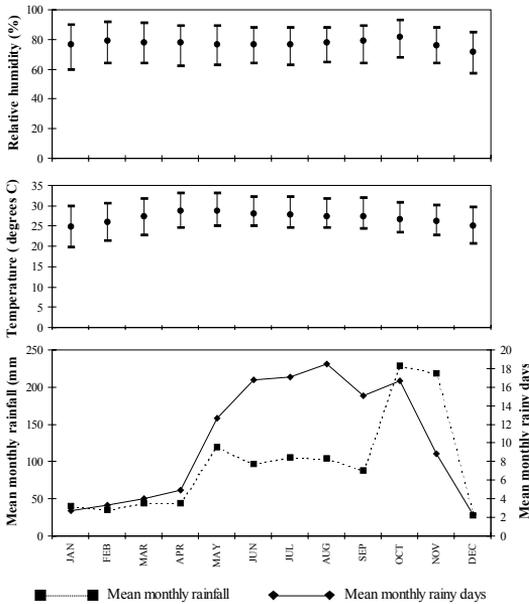


FIGURE 2. Climatological data during the period, 1970-2000, from Prachuap Khiri Khan Station (Data from the Department of Meteorology, Bangkok, Thailand).

average maximum temperature was about 33.2°C during April-May, and the average minimum temperature 19.9°C in January (Fig. 2). The average annual relative humidity was about 78%, while the average maximum relative humidity was 89% and the average minimum relative humidity was 63%.

The average annual rainfall was 1,150 mm. The highest average annual rainfall, of approximately 300 mm, was observed in October, whilst the lowest annual rainfall, of about 28 mm, and a few rainy days were observed in December, which is the driest month (Fig. 2).

The vegetation at Huai Yang Waterfall National Park consists of Mixed Deciduous Forest, Dry Evergreen Forest, Tropical Evergreen Forest and Hill Evergreen Forest (Plerdpling, 2000).

MATERIALS AND METHODS

The specimen collections were made along the main existing forest trails, extending about

5 m from both sides. Field trips were done in monthly interval during March 1999-October 2000. Some moist areas were frequently visited such as, Huai Yang Waterfall, Bua Sawan Waterfall, Khao Lan Waterfall, Khao Lan peak, Huai Hin Dad Waterfall, Kha Onn Waterfall, Praksai Canal and the summit of Khao Luang.

Voucher specimens were deposited at the Professor Kasin Suvatabandhu Herbarium, Department of Botany, Faculty of Science, Chulalongkorn University (BCU) and the Forest Herbarium, Royal Forest Department (BKF). Nomenclature and arrangement of taxa in this work followed Boonkerd and Pollawatn (2000). Author of scientific names and their abbreviation are in accordance with the author of plant names (Brummitt and Powell, 1992).

RESULTS

Two hundred and four specimens of fern and fern allies were collected from March 1999 to October 2000. They are classified into 26 families, 63 genera and 128 species (Appendix). Among these 11 species in 4 genera from 3 families are fern allies. Three families of true fern namely Polypodiaceae, Aspleniaceae and Thelypteridaceae are among the common families. Polypodiaceae included 28 species in 15 genera, whilst Aspleniaceae and Thelypteridaceae included 11 and 10 species respectively. The vegetation types and pteridophyte distribution are noted below.

Vegetation types and Pteridophyte distribution

Huai Yang Waterfall National Park is composed of four types of vegetations namely Dry Evergreen Forest, Mixed Deciduous Forest, Tropical Evergreen Forest and Hill Evergreen Forest. Fern and fern allies are naturally dispersed in all of these vegetations, but in rather different numbers of species.

Dry Evergreen Forest

Dry Evergreen Forest covers an area of 74.92 km² or approximately 46% of the whole area. The elevation ranges from 100 to 800 m.

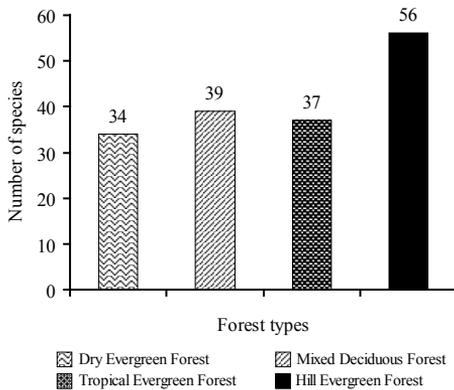


FIGURE 3. A summary of ferns and fern allies collected in each forest.

Plants in this forest are both deciduous and evergreen trees and the canopy is green all year round. In this forest, the soil layer is deep and composed mainly of moist sandy loam (Plerd-pling, 2000).

Thirty four species of pteridophytes were found in this forest type (Fig. 3). It was found that 14 species was restricted only in this forest type and 12 species were found both in Mixed Deciduous Forest and Dry Evergreen Forest. Generally, pteridophytes grew in shady areas and nearby streams. Lithophytes and terrestrial ferns were approximately the same amount. Relative humidity is generally higher than in a Mixed Deciduous Forest. Accordingly, numbers of epiphytes and lithophytes were higher than in a Mixed Deciduous Forest. For example, *Crepidomanes megistostomum* was found in shady and moist cliffs nearby streams, while *Cyathea borneensis* was found only once by a stream. *Antrophyum callifolium* usually grows on moist rocks or tree trunks. Whereas *Pteridry syrmatica* can be found on shady hill slopes. In this type of forest *Platyserium holttumii* is one of the large epiphytes, and this species usually grows on high branches of trees. Whilst *Vittaria ensiformis*, a small plant, is usually found on a shady spot of tree trunk or growing on a decomposed log. Nearby this area, a medium-size fern, *Pyrrosia stigmosa* was found on humus rich rocks.

Mixed Deciduous Forest

This type of forest covers an area of 49.95 km² or approximately 31% of the whole area. It is a Dry Upper Mixed Deciduous Forest which ranges in elevation from about 500 to 800 m with low relative humidity, and a thin layer of soil on the base rock. Most trees are dwarf and bamboos are frequently found throughout (Plerd-pling, 2000).

So far, 39 species of pteridophytes were observed in this forest type (Fig. 3), but 12 of these species can also be found in the others. Most of them are terrestrial plants and lithophytes, with only a few species of epiphytes. Epiphytes are commonly seen on the lower part of tree-trunks, probably due to low relative humidity on upper portion of trees. In addition, an aquatic species, *Ceratopteris thalictroides*, was found in this forest. Generally, pteridophytes usually grow in shady places, along stream banks or in a moist spot. The common species included: *Adiantum caudatum*, this maidenhair fern usually grow on dry mountain slopes. Whereas *Doryopteris ludens* is found in both moist and dry places. While *Cyclosorus interruptus* is found in rather open areas along streams and *Microsorium pteropus* is a rheophyte often found in the moist areas near streams or waterfalls. It was found that some epiphytic ferns in this forest showed some drought resistance or drought avoidance to some degrees. For example, *Davallia denticulata*, *D. solida*, *Drynaria bonii*, *D. quercifolia* and *D. rigidula* shed their fronds or parts of lamina during the dry season, and only rhizomes are found on rocks or on tree trunks. Rhizomes of these ferns are succulent and covered with dense scales; these characteristics protected the plant from desiccation and it survived the dry season. Some terrestrial species, for example *Selaginella ostenfeldii*, *Ophioglossum petiolatum*, *Notholaena velutina* and *Pityrogramma calome-lanos* shed their fronds or their fronds were dried out during the dry months. The rhizomes, however, still remained underneath the soil and these ferns became dormant. Shortly after some rain new leaves will be produced on these ferns. Some fern species reduced transpiration

by decreasing their leaf surface from the dry atmosphere by curling their fronds, such as *Adiantum caudatum*, *A. zollingeri*, and *Pyrrosia adnascens*.

Tropical Evergreen Forest

Tropical Evergreen Forest covers an area of 32.5 km² or approximately 20% of the whole area. The elevation ranges from 800 to 1,000 m. This forest type is composed of medium-to-tall trees which remain almost green during the dry season, and has a closed to slightly open canopy. There are a large number of shade-loving ground covers plants such as the zingiberaceous family. Palms also can be found elsewhere. By and large relative air humidity is rather high, soil layers are deep with high soil humidity (Plerdpling, 2000). Thirty seven species of pteridophytes were found (Fig. 3), and 21 species can be found only in this forest type. Although Tropical Evergreen Forest is close to the Dry Evergreen Forest, only 2 species, i.e. *Asplenium simonsianum* and *Diplazium simplicivenium* were common species. In contrast, 13 species of pteridophytes were commonly found in both Tropical Evergreen Forest and Hill Evergreen Forest. Examples of terrestrial ferns are *Cibotium barometz*, *Pteris cretica*, *Bolbitis heteroclita*, *Tectaria polymorpha*, *Diplazium crenatoserratum*, *Leptochilus macrophyllus*. Among these, *Cibotium barometz* is a big fern, with many big bipinnate fronds, usually 3-4 metres in length. The other species are medium-size ferns, usually occupying moist and shady places nearby streams. However, *L. macrophyllus* usually grows on the buttress or base of tree trunks.

Hill Evergreen Forest

This forest type covers an area of 3.64 km² or approximately 2% of the whole area. It is a primary forest near the summit of Khao Luang. The elevation ranges from 1,000 to 1,250 m. Soil in this forest is rather deep, covered by rich humus and high humidity (Plerdpling, 2000). Main canopy trees are broad-leaves members of Fagaceae, Lauraceae, Theaceae and Dipterocarpaceae. Tree trunks are usually

covered with bryophytes, but filmy ferns are uncommon. In general, rainfall can be observed from March to November. The Hill Evergreen Forest has the highest diversity of pteridophytes. In this study 56 species were found (Fig. 3) as terrestrial plants, lithophytes and epiphytes on tree trunk or branches. It was found that 38 species of pteridophytes are true mountainous plants, since they are confined to Hill Evergreen Forest. The high relative air humidity in this forest probably resulted in the high numbers of species in lithophytes and epiphytes. In open grasslands, *Lycopodiella cernua* is a common species. While *Asplenium perakense*, *Elaphoglossum subellipticum*, *Huperzia hamiltonii* and *Lepisorus scolopendrium* were found as epiphytes. The common terrestrial species included *Microlepia puberula* and *Polystichum attenuatum*. Lithophytes are common on moist rocks nearby streams, for example *Asplenium unilaterale*. In addition, *Oleanandra musifolia* occurs on tree trunks or on dry cliffs. All of the species mentioned above are examples of pteridophytes which are restricted to Hill Evergreen Forest.

In short, Hill Evergreen Forest, which can be found only near the summit of Khao Luang, has the highest diversity of pteridophytes, despite its small proportion of the total area (2%). The high diversity may be due to the suitable ecological factors for pteridophytes in this forest type. Moreover, the difficulty in accessing to this remote site means it may be more or less protected from human disturbance.

DISCUSSION

Rare species

From literature reviews and the results of this study, it can be concluded that two rare species of ferns were found in Huai Yang Waterfall National Park. The first one, if correctly identified, is *Asplenium simonsianum*. This is an epiphytic fern that occurs in Mixed Deciduous Forest or Moist Evergreen Forest at the elevation of 300-800 m. This species is a member of the Indo-Burmese element (Bed-

dome, 1969; Tagawa and Iwatsuki, 1985), it was only collected from the Tak Province of lower northern Thailand. So far its known distribution was exclusively in Assam, Northeast India, where the type specimen was collected. Voucher specimens of this species could not be found either at the Professor Kasin Suvatabandu Herbarium (BCU) or the Forest Herbarium (BKF). The other rare species is *Lindsaea divergens*. From its present distribution it was a member of Malesian element (Tagawa and Iwatsuki, 1985). It was collected only from Songkhla Province and voucher specimens could not be found either at BCU or BKF. Nonetheless geographical distribution of this species is greater in the Malay Peninsula (Kramer, 1971).

Record of new locality

With regard to the distribution, it was found that 9 species occurring in Huai Yang Waterfall National Park are worth noting for their geographical distribution.

The Malesian element

Plant species which are members of Malesian element are known for their limited distribution extending from Malay Archipelago and Malay Islands to the Isthmus of Kra, in Ranong Province, Thailand (see Boonkerd, 1996). However, they may extend to central, southeastern and southwestern Thailand (Iwatsuki, 1973). According to the distribution noted in Flora of Thailand, Vol. 3 (Tagawa and Iwatsuki, 1979; 1985; 1988; 1989), the following species may be noted as members of Malesian element:

Asplenium perakense is a lithophyte or epiphyte. It was found in Hill Evergreen Forest of Khao Luang at an elevation of 1,000-1,700 m in Nakhon Si Thammarat Province. In this studied area, it was found commonly in Hill Evergreen Forest at the elevation of 1,050 m.

Ctenopteris mollicoma was found at Khao Luang in Hill Evergreen Forest, in Nakhon Si Thammarat and Yala Provinces. It is a lithophyte or epiphyte in Hill Evergreen Forest at the elevation of 1,050 m in this studied site.

Diplazium bantamense was found in many provinces of peninsular Thailand, e.g. Surat

Thani, Nakhon Si Thammarat, Trang and Yala Provinces. In this studied area, it occurs commonly near stream banks at an elevation of 800 m in Moist Evergreen Forest.

Diplazium crenatoserratum was found in Surat Thani, Nakhon Si Thammarat, Satun and Yala Provinces. In this studied site, it occurs commonly near streams at an elevation of 800 m in Tropical Evergreen Forest.

Leptochilus macrophyllus was found in Narathiwat, Yala and Pattani Provinces. This species is uncommon in this studied site. It grows on rock or tree-trunks at 800 m in Tropical Evergreen Forest.

Lindsaea divergens was found at Khao Khaeo in Songkhla Province. It is an uncommon species in this studied site, and grows in rock crevices at 500 m in Mixed Deciduous Forest.

Microsorium heterocarpum was found at Khao Chong in Trang Province. In this studied site, it was commonly found on rocks near stream banks or on rocks in streamlets at the elevation of 800 m in Tropical Evergreen Forest.

The Indo-Burmese element

The Indo-Burmese element occupies the areas from the eastern Himalayas and Guinghai-Tibetan plateau and the subtropics of South China, the Ganges plain, eastern India, Bangladesh, Upper Myanmar and Thailand (see Boonkerd, 1996). It was found that *Asplenium simonsianum* occurs in Assam, N.E. India. This species was found in Tak Province, which was recorded as a southern limit of this species. The occurrence of this species at Huai Yang Waterfall National Park is still in agreement with the distribution of the Indo-Burmese element. But the southernmost limit of this species will be at Prachuap Khiri Khan Province instead of Tak Province. It is commonly found as an epiphyte at the elevation of 300-800 m in Mixed Deciduous Forest and Tropical Evergreen Forest. This fern is also noted as a rare species in Thailand.

The Indo-Chinese element

The Indo-Chinese region covers the areas of Southern China and Indochina. According to distribution of *Diplazium petri* in Flora of Thailand (Tagawa and Iwatsuki, 1988). This species was a member of Indo-Chinese element. In Thailand, it was found in Chon Buri and Nakhon Si Thammarat Provinces. The presence of this species at Huai Yang Waterfall National Park confirmed the wide distribution of this species outside the boundary of Indo-Chinese region. It is found at the elevation of 1,050 m in Hill Evergreen Forest in this studied site.

Geographically, Huai Yang Waterfall National Park within the boundaries of the Indo-Burmese element, however, seven species which are members of the Malesian-element flourish here. So, Prachaup Khiri Khan Province may be the meeting point for plants from the Indo-Burmese element, Indo-Chinese element, and the Malesian element.

Pteridophytes of Prachaup Khiri Khan and Western Region

In this study, a total of 128 species of pteridophytes were identified within Huai Yang Waterfall National Park. It can be concluded that pteridophyte numbers in the national park represent about 20% of the total in Thailand. Of these 128 species, 64 species have never been recorded in the western Thailand before. In addition, 100 species were reported for the first time in Prachaup Khiri Khan Province. Nineteen species of pteridophytes were collected from Huai Yang Waterfall National Park as were noted in Flora of Thailand (Tagawa and Iwatsuki, 1979; 1985; 1988; 1989). However, in this survey only 15 species were found as followed:- *Asplenium crinicaule*, *Bolbitis heteroclita*, *Crepidomanes minutum*, *Drynaria bonii*, *D. quercifolia*, *Grammitis dorsipila*, *Hymenophyllum barbatum*, *Humata repens*, *Microsorium pteropus*, *Notholaena velutina*, *Psilotum nudum*, *Pteridrys syrmatica*, *Pyrrosia adnascens*, *P. longifolia* and *P. stigmosa*.

From these 15 species, *Notholaena velutina* was found only at Hua Hin and Huai Yang

Waterfall National Park in Prachaup Khiri Khan Province (Tagawa and Iwatsuki, 1985). At Huai Yang Waterfall National Park this species is found in abundance in rock crevices in Mixed Deciduous Forest. Four species namely *Crepidomanes latealatum*, *Tectaria manilensis*, *Oleandra pistillaris*, and *Prosaptia khasyana* could not be found from this survey. Though collections of pteridophytes were made nearly every month from March 1998 to October 2000 in Khao Luang. These four species were collected from Khao Luang as was recorded in Flora of Thailand (Tagawa and Iwatsuki, 1979; 1985; 1988; 1989).

ACKNOWLEDGMENTS

We would like to express our thanks to the curators and staff of the BK, BKF for their kind permission to study their pteridophyte specimens and the Professor Kasin Suvathabhandhu Herbarium, Department of Botany, Faculty of Science, Chulalongkorn University (BCU) for providing laboratory facilities for this research.

Our thanks to the chiefs and staff of Huai Yang Waterfall National Park for their cooperation during specimen collection in the National Park. In addition, we would like to thank the officers of the Meteorological Department for providing climatological data of Prachaup Khiri Khan station.

This work was supported by the TRF/BIOTECH Special Program for Biodiversity Research and Training grant BRT 542078.

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APPENDIX

The Pteridophytes of Huai Yang Waterfall National Park.

Abbreviations are as follows:

Habit: A= aquatic herb; E= epiphytic herb; L= lithophytic herb; T= terrestrial herb.

Habitat: 1= Dry Evergreen Forest; 2= Mixed Deciduous Forest; 3= Tropical Evergreen Forest 4= Hill Evergreen Forest.

Abundance: UC= uncommon; SC= slightly common; C= common; VC= very common.

Family/Species	Habit	Habitat & Abundance
Lycopodiaceae		
<i>Huperzia hamiltonii</i> (Spreng.) Trevis.	E	4, SC
<i>Lycopodiella cernua</i> (L.) Pic. Serm.	T	4, SC
Selaginellaceae		
<i>Selaginella amblyphylla</i> Alston	L	4, SC
<i>Selaginella argentea</i> (Wall. ex Hook. & Grev.) Spring	T, L	2, 4, C
<i>Selaginella delicatula</i> (Desv. ex Poir.) Alston	T	2, SC
<i>Selaginella kurzii</i> Baker	L	2, SC
<i>Selaginella minutifolia</i> Spring	L	1, C
<i>Selaginella ostenfeldii</i> Hieron	T	2, C
<i>Selaginella roxburghii</i> (Hook. & Grev.) Spring	T, L	1, C
<i>Selaginella vaginata</i> Spring	T, L	2, C
Psilotaceae		
<i>Psilotum nudum</i> (L.) Beauv.	L, E	2, SC
Marattiaceae		
<i>Angiopteris evecta</i> (G. Forst) Hoffm.	T	2, 4, C
Ophioglossaceae		
<i>Ophioglossum petiolatum</i> Hook.	T	2, SC
Hymenophyllaceae		
<i>Crepidomanes bipunctatum</i> (Poir.) Copel.	L, E	1, 3, 4, VC
<i>Crepidomanes megistostomum</i> (Copel.) Copel.	L	4, SC
<i>Crepidomanes minutum</i> (Blume) K. Iwats.	L	1, SC
<i>Crepidomanes parvifolium</i> (Baker) K. Iwats.	L	3, SC
<i>Hymenophyllum barbatum</i> (Bosch) Baker	E	3, UC

Family/Species	Habit	Habitat & Abundance
<i>Hymenophyllum exsertum</i> Wall. ex Hook.	E	4, UC
Gleicheniaceae		
<i>Dicranopteris linearis</i> (Burm. f.) Underw.	T	4, SC
Schizaeaceae		
<i>Lygodium microphyllum</i> (Cav.) R. Br.	T	4, SC
<i>Lygodium salicifolium</i> C. Presl	T	2, C
Dennstaedtiaceae		
<i>Microlepia puberula</i> v. A. v. R.	T	4, C
<i>Microlepia speluncae</i> (L.) T. Moore	T	1, 2, C
<i>Microlepia strigosa</i> (Thunb.) C. Presl	T	4, VC
Dicksoniaceae		
<i>Cibotium barometz</i> J. Sm.	T	3, C
Lindsaeaceae		
<i>Lindsaea divergens</i> Hook. & Grev.	L	2, UC
<i>Lindsaea ensifolia</i> Sw.	T	4, SC
<i>Sphenomeris chinensis</i> (L.) Maxon var. <i>divaricata</i> (H. Christ) K. U. Kramer	T	4, SC
Cyatheaceae		
<i>Cyathea borneensis</i> Copel.	T	1, UC
<i>Cyathea latebrosa</i> (C. Presl) Copel.	T	3, 4, UC
Adiantaceae		
<i>Adiantum caudatum</i> L.	T	2, C
<i>Adiantum philippense</i> L.	L	2, SC
<i>Adiantum zollingeri</i> Mett. ex Kuhn	T	1, 2, C
<i>Doryopteris ludens</i> (Wall. ex Hook.) J. Sm.	T	1, 2, VC
<i>Hemionitis arifolia</i> (Burm. F.) T. Moore	T	2, UC
<i>Notholaena velutina</i> Tardieu & C. Chr.	T, L	2, C
<i>Pityrogramma calomelanos</i> (L.) Link.	T	2, SC
Parkeriaceae		
<i>Ceratopteris thalictroides</i> (L.) Brongn.	A	2, UC
Pteridaceae		
<i>Pteris biaurita</i> L.	T	1, 2, 3, 4, C
<i>Pteris cretica</i> L.	T	3, C
<i>Pteris longipinnula</i> Wall. ex J. Agardh	T	3, UC
<i>Pteris venusta</i> Kunze	T, L	2, C
<i>Stenochlaena palustris</i> (Burm. f.) Bedd.	T	2, VC
Vittariaceae		
<i>Antrophyum callifolium</i> Blume	L	1, SC
<i>Vittaria amboinensis</i> Fée	E	4, SC
<i>Vittaria ensiformis</i> Sw.	E	1, VC
<i>Vittaria sikkimensis</i> Kuhn	L	4, SC
Aspleniaceae		
<i>Asplenium cheilosorum</i> Kunze ex Mett.	T, L	4, SC
<i>Asplenium confusum</i> Tardieu & Ching	L, E	1, 3, 4, VC
<i>Asplenium crinicaule</i> Hance	T, L	1, 3, 4, C
<i>Asplenium falcatum</i> Lam.	L, E	4, SC
<i>Asplenium nidus</i> L.	L, E	1, 3, 4, VC
<i>Asplenium normale</i> D. Don	T, L	3, SC
<i>Asplenium perakense</i> B. Mathew & H. Christ	L, E	4, C
<i>Asplenium scortechinii</i> Bedd.	L, E	3, 4, C
<i>Asplenium simonsianum</i> Hook.	E	1, 3, C

Family/Species	Habit	Habitat & Abundance
<i>Asplenium unilaterale</i> Lam.	T, L	4, SC
<i>Asplenium yoshinagae</i> Makino	L, E	4, SC
Blechnaceae		
<i>Blechnum orientale</i> L.	T	2, 4, SC
Lomariopsidaceae		
<i>Bolbitis appendiculata</i> (Willd) K. Iwats.	L	3, 4, C
<i>Bolbitis heteroclita</i> (C. Presl) Ching	E	3, C
<i>Bolbitis sinensis</i> (Baker) K. Iwats	L, E	4, VC
<i>Bolbitis virens</i> (Wall. ex Hook. & Grev.) Schott var. <i>compacta</i>	T, L	3, C
Hennipman		
<i>Elaphoglossum subellipticum</i> Rosenst.	E	4, C
Dryopteridaceae		
<i>Dryopteris sparsa</i> (D. Don) Kuntze	T	4, C
<i>Heterogonium gurupahense</i> (C. Chr.) Holttum	T	3, SC
<i>Polystichum attenuatum</i> Tagawa & K. Iwats.	T	4, VC
<i>Polystichum biaristatum</i> (Blume) T. Moore	T	3, SC
<i>Pteridrys sylvatica</i> (Willd.) C. Chr. & Ching	T	1, C
<i>Tectaria griffithii</i> (Baker) C. Chr.	T	4, UC
<i>Tectaria impressa</i> (Fée) Holttum	T	2, C
<i>Tectaria polymorpha</i> (Wall. ex Hook.) Copel.	T	3, VC
Thelypteridaceae		
<i>Christella dentata</i> (Forssk.) Holttum	T	2, SC
<i>Christella papilio</i> (C. Hope) Holttum	T	2, SC
<i>Christella parasitica</i> (L.) H. Lev.	T	4, SC
<i>Coryphopteris hirsutipes</i> (C.B. Clarke) Holttum	T,L	4, SC
<i>Cyclosorus hirtisorus</i> (C. Chr.) Ching	T	4, SC
<i>Cyclosorus interruptus</i> (Willd.) H. Ito	T	2, VC
<i>Macrothelypteris torresiana</i> (Gaudich.) Ching	T	1, C
<i>Pneumatopteris truncata</i> (Poir.) Holttum	T	1, 4, C
<i>Pronephrum asperum</i> (C. Presl) Holttum	T	3, C
<i>Pronephrum triphyllum</i> (Sw.) Holttum	T	3, SC
Woodsiaceae		
<i>Diplazium bantamense</i> Blume	T	3, C
<i>Diplazium crenatoserratum</i> (Blume) T. Moore	T	3, C
<i>Diplazium dilatatum</i> Blume	T	3, VC
<i>Diplazium donianum</i> (Mett.) Tardieu	T	3, 4, VC
<i>Diplazium esculentum</i> (Retz.) Sw.	T	1, SC
<i>Diplazium petri</i> Tardieu	T	4, C
<i>Diplazium simplicivenium</i> Holttum	T	1, 3, C
<i>Diplazium</i> sp.	T	3, SC
Davalliaceae		
<i>Davallia denticulata</i> (Burm. f.) Mett. ex Kuhn	L, E	1, 2, VC
<i>Davallia solida</i> (G. Forst.) Sw.	L, E	1, 2, C
<i>Humata repens</i> (L. f.) J. Small ex Diels	L, E	3, 4, C
<i>Leucostegia immersa</i> C. Presl	T, L	4, SC
Oleandraceae		
<i>Nephrolepis biserrata</i> (Sw.) Schott	T	1, 2, SC
<i>Nephrolepis hirsutula</i> (G. Forst.) C. Presl	T	1, 2, VC
<i>Oleandra musifolia</i> (Blume) C. Presl	L, E	4, SC
Polypodiaceae		
<i>Aglaomorpha coronans</i> (Wall. ex Mett.) Copel.	L, E	3, 4, VC

Family/Species	Habit	Habitat & Abundance
<i>Belvisia mucronata</i> (Fée) Copel.	E	3, UC
<i>Belvisia revoluta</i> (Blume) Copel.	E	4, C
<i>Colysis pedunculata</i> (Hook. & Grev.) Ching	E	4, C
<i>Crypsinus oxylobus</i> (Wall. ex Kunze) Sledge	E	2, C
<i>Drynaria bonii</i> H. Christ	L, E	4, C
<i>Drynaria quercifolia</i> (L.) J. Sm.	L	1, 2, VC
<i>Drynaria sparsisora</i> (Desv.) T. Moore	E	2, UC
<i>Drynaria rigidula</i> (Sw.) Bedd.	L, E	2, 3, SC
<i>Goniophlebium subauriculatum</i> (Blume) C. Presl	L, E	1, 3, 4, VC
<i>Lemmaphyllum carnosum</i> (J. Sm. Ex Hook.) C. Presl	L, E	3, 4, C
<i>Lepisorum scolopendrium</i> (Buch.-Ham. Ex D. Don) Mehra & Bir	E	4, C
<i>Leptochilus decurrens</i> Blume	T, L	3, SC
<i>Leptochilus macrophyllus</i> (Blume) Noot.	L, E	3, SC
<i>Loxogramme avenia</i> (Blume) C. Presl	L	1, 4, SC
<i>Microsorium dilatatum</i> (Bedd.) Sledge	L	4, C
<i>Microsorium heterocarpum</i> (Blume) Ching	L	3, C
<i>Microsorium nigrescens</i> (Blume) Copel.	L	1, SC
<i>Microsorium pteropus</i> (Blume) Copel.	L	2, C
<i>Microsorium punctatum</i> (L.) Copel.	L	1, 2, C
<i>Microsorium zippelii</i> (Blume) Ching	T, L	1, SC
<i>Neocheiropteris normalis</i> (D. Don) Tagawa	E	4, VC
<i>Platynerium holttumii</i> Jonch. & Hennipman	E	1, SC
<i>Pyrrhosia adnascens</i> (Sw.) Ching	L, E	1, 2, VC
<i>Pyrrhosia eberhardtii</i> (H. Christ) Ching	L, E	4, C
<i>Pyrrhosia longifolia</i> (Brum. f.) Mort.	E	2, UC
<i>Pyrrhosia nuda</i> (Giesenh.) Ching	E	1, UC
<i>Pyrrhosia stigmata</i> (Sw.) Ching	L	1, VC
Grammitidaceae		
<i>Ctenopteris mollicoma</i> (Nees & Blume) Kunze	L, E	4, SC
<i>Grammitis dorsipila</i> (H. Christ) C. Chr. & Tardieu	E	4, UC