

An Annotated Checklist of Higher Plants in Ayer Hitam Forest Reserve, Puchong, Selangor

I. FARIDAH HANUM¹, A. Z. IBRAHIM², SHAMSUL KHAMIS³, M. NAZRE¹,
P. LEPUN¹, G. RUSEA⁴, J. J. LAJUNI⁵ & A. LATIFF⁵

¹Faculty of Forestry, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

²School of Environmental and Natural Resource Sciences, Faculty of Science and Technology
Universiti Kebangsaan Malaysia, 43600 Bangi Selangor, Malaysia

³Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

⁴Department of Biology, Faculty of Science and Environment Studies, Universiti Putra Malaysia
43400 UPM Serdang, Selangor, Malaysia

⁵Institute for Environment and Development, Universiti Kebangsaan Malaysia
43600 Bangi, Selangor, Malaysia

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ABSTRAK

Hutan Simpan Ayer Hitam ialah suatu hutan subjenis Kelat-Kedondong bagi hutan tanah rendah dipterokarpa yang terletak di Lembah Klang yang kini sedang mengalami suatu pembangunan sosio-ekonomi dan fizikal amat pesat. Hutan ini telah beberapa kali dibalok dalam 60 tahun yang lalu dan kini beberapa ceruk vegetasinya sedang menuju ke arah klimaks semula. Ekspedisi ini yang telah dijalankan pada 2-5 Mei 2000. merangkumi beberapa ahli botani yang telah memerhati dan mengutip spesimen tumbuhan. Enumerasi yang diberikan di sini adalah berdasarkan kepada spesimen yang dikutip semasa ekspedisi, mencakupi 262 spesies tumbuhan vaskular yang tergolong dalam 142 genus dan 56 famili. Famili Myrtaceae, dengan 22 spesies adalah famili yang terbesar di dalam senarai, diikuti oleh Euphorbiaceae, Dipterocarpaceae dan Annonaceae, masing-masing dengan 21, 17 dan 14 spesies. Spesies genus *Knema* adalah yang terbesar dengan 13 spesies dan diikuti oleh *Memecylon* *Syzygium* dan *Diospyros*, masing-masing dengan 9, 7 dan 7 spesies.

ABSTRACT

Ayer Hitam Forest Reserve is a Kelat-Kedondong subtype of the lowland dipterocarp forest situated in the Klang Valley which is currently undergoing a tremendous pace of socio-economic and physical development. The forest had been logged many times in the last 60 years or so and most vegetation niches are beginning to recover to their climax again. Our expedition, from 2-5 May 2000 involved a few botanists who observed and collected specimens of higher plants. The enumeration provided here is based only on the specimens collected during the expedition, includes 262 species of vascular plants belonging to 142 genera and 56 families. The Myrtaceae, with 22 species is the largest family in the checklist, followed by Euphorbiaceae, Dipterocarpaceae and Annonaceae with 21, 17 and 14 species, respectively. Species-wise the genus *Knema*, is the largest with 13 species, followed by *Memecylon*, *Syzygium* and *Diospyros* with 9, 7, and 7 species, respectively.

INTRODUCTION

The Ayer Hitam Forest Reserve, Puchong, Selangor covers an area of about, 3,500 ha prior to lease to Universiti Putra Malaysia in 1996. The Selangor State Government on 7th October 1996 leased this patch of the remaining lowland forest in the Klang Valley with 6 compartments, namely Compartments 1, 2, 12, 13, 14 and 15 to

the University for 80 years for the purpose of education and research. In the past 10 years the University had used the forests for various educational purposes including industrial training of their forestry students and also research in biodiversity and environment by students and staffs from various faculties. The faculty members also were active in various

research projects in the forest. The size of this forest is now reduced by about 64% to 1,248 ha, after it was further excised for some socio-economic development projects such as housing estates, oil palm plantation, new townships, factories, and highways, among others. In the present survey, this forest is classified as a disturbed Kelat-Kedondong-Mixed Dipterocarp type of lowland forest type (Faridah Hanum, 1999). Mat-Salleh (1999) has shown the role and function of a similar forest at Universiti Kebangsaan Malaysia that has been used by students and staff for similar purposes. The Ayer Hitam FR is located at 3° 00.00' N to 3° 02.20' N and 101° 37.90' E to 101° 40.00' E, approximately 20 km southwest of Kuala Lumpur.

Currently, this forest is thus completely surrounded by developed and developing areas, making it an "island forest" isolated in the middle of modern infrastructures and urban society. Being strategically located within the Multimedia Super Corridor, that connects the commercial city of Kuala Lumpur with the new administrative city of Putrajaya and business city of Cyberjaya, it is the only remaining lowland forest found in the Klang Valley, other than the smaller Bukit Nenas Forest Reserve in the heart of Kuala Lumpur. Historically, this forest was selectively logged several times from 1936 to 1966 and the impoverished diversity has begun to recover quite well (Mohamad Zakaria and Abdul Rahim 1999; Mohamad Zakaria and Rahmat Topani 1999). Formerly, the area was occupied by one of the remaining group of indigenous people, the Temuan tribe, but now moved to other more-disturbed areas of the forest (Faridah Hanum and Nurulhuda Hamzah 1999). This forest is also readily accessible by all kind of vehicles up to the base camp.

Logging activities were carried out in compartments 12 and 13 from 1936 until 1966. In those 30 years, these compartments were logged three times using Commercial Regeneration Felling system in 1936-1943 and 1965-1966, and Selective Felling in 1946-1954 (Faridah Hanum 1999). However, in 1990 silvicultural treatment has been carried out in these compartments.

CHECKLIST OF HIGHER PLANTS IN AYER HITAM FOREST RESERVE

The checklist produced below is the result of botanical observation and collection done during the Scientific Expedition. It is arranged

alphabetically by families, each family is followed by the species known, according to Turner (1995). Where possible local name(s) is included with brief notes on habit and distribution.

Gymnosperms

1.0 Podocarpaceae

- 1.1 *Podocarpus nerifolius* D. Don
Podo Bukit

Tree to 20 m tall; normally confined to hill and montane forests; its occurrence in this forest is botanically very interesting. Probably it is introduced from the hill forest or an escape from cultivation.

2.0 Gnetaceae

- 2.1 *Gnetum cuspidatum* Blume

Large liana; commonly found in the lowland and hill forests; widespread.

Angiosperms - Dicotyledons

1.0 Acanthaceae

- 1.1 *Acanthus volubilis* Wall.

Trailing shrub which is commonly found scattered in the surveyed area.

- 1.2 *Asystasia gangetica* (L.) T. Anderson
Rumput Israel

Creeping herbs; normally found in waste and idle areas, sometimes in cultivated areas too; could be considered a noxious weed which is believed to be introduced from India and now beginning to be naturalized in the country.

2.0 Alangiaceae

- 2.1 *Alangium ebenaceum* (C.B. Clarke) Harms
var. *ebenaceum*

Mentulang Daun Bujur

Tree to 10 m tall; commonly found in lowland forest.

3.0 Anacardiaceae

- 3.1 *Bouea macrophylla* Griff.

Kundang

Tree reaching up to 20 m, produce edible fruits; quite common in lowland and hill forest.

- 3.2 *Bouea oppositifolia* (Roxb.) Meisn.

Kundang Tikus, Rumia

Tree reaching to 20 m tall, also bears edible fruits; lowland forest up to 700 m altitude; widespread.

- 3.3 *Buchanania sessifolia* Blume

Rengas Air

Small to medium tree; lowland forest to 700 m; throughout.

- 3.4 *Gluta malayana* (Corner) Ding Hou
Rengas Kerbau Jalang
Tree to 30 m tall; lowland forest, including swampy areas; quite widespread.
- 3.5 *Mangifera magnifica* Kochummen
Macang Hutan
Big tree reaching 30 m tall; lowland forest to 700 m altitude; widespread and apparently quite common in Pasoh Forest Reserve.
- 3.6 *Mangifera quadrifida* Jack
Macang hutan
Tree to 30 m tall; lowland rain forest to 900 m altitude; widespread.
- 3.7 *Melanochyla angustifolia* Hook.f.
Rengas
Tree to 20 m tall; lowland forest to 600 m altitude; widespread.
- 3.8 *Melanochyla fulvinervis* (Blume) Ding Hou
Rengas Padi Kulit Hitam
Tree to 20 m tall; lowland forest, occasionally in the hills up to 1350 m altitude; widespread.
- 3.9 *Parishia paucijuga* Engl.
Rengas
Tree to 30 m tall; lowland and hill forest to 400 m altitude; widespread.
- 4.0 **Annonaceae**
- 4.1 *Alphonsea curtisii* King
Mempisang
Medium tree reaching 20 m tall; lowland forest; an element of the northern part of Peninsular Malaysia but recorded for the first time in Selangor.
- 4.2 *Alphonsea cylindrica* King
Mempisang
Tree to 10 m tall; lowland forest; not widespread.
- 4.3 *Alphonsea lucida* King
Mempisang
Shrub to 3 m tall; lowland forest; endemic to Peninsular Malaysia.
- 4.4 *Fissistigma kingii* (Boerl.) Burkill
Mempisang
Large liana; lowland forest; quite widespread.
- 4.5 *Fissistigma lanuginosum* (Hook.f. & Thomson) Merr.
Mempisang
Liana; lowland forest; widespread.
- 4.6 *Monocarpia marginalis* (Scheff.) J. Sinclair
Mempisang
Large tree reaching to 30 m tall; produce good timber; rather common in lowland forest; widespread.
- 4.7 *Phaeathus ophthalmicus* (Roxb. ex G. Don) J. Sinclair
Mempisang
Small shrub; lowland forest; widespread.
- 4.8 *Polyalthia cauliflora* Hook.f. & Thomson
var. *cauliflora*
Mempisang
Shrub or small tree; lowland forest; quite widespread.
- 4.9 *Polyalthia motleyana* (Hook.f.) Airy Shaw
var. *oblonga* (King) J. Sinclair
Mempisang
Small tree to 4 m tall; lowland to lower montane forest.
- 4.10 *Polyalthia rumphii* (Blume) Merr.
Mempisang
Tree to 15 m tall; lowland and hill forest; widespread.
- 4.11 *Polyalthia sumatrana* (Miq.) Kurz
Mempisang
Tree to 20 m tall; lowland and hill forest; widespread.
- 4.12 *Popowia fusca* King
Mempisang
Tree to 10 m tall; lowland forest; endemic to Peninsular Malaysia with restricted distribution.
- 4.13 *Xylopia densifolia* Hook.f.
Mempisang
- 4.14 *Xylopia ferruginea* (Hook.f. & Thomson) Hook.f. & Thomson var. *ferruginea*
Jangkang Bukit
Tree to 20 m tall; lowland forest; widespread.
- 5.0 **Apocynaceae**
- 5.1 *Dyera costulata* (Miq.) Hook. f.
Jelutong
Huge lactiferous tree reaching 40 m; lowland forests; has been reported gregariously growing in Kuala Langat South peat swamp forest; widespread.
- 6.0 **Aristolochiaceae**
- 6.1 *Thottea corymbosa* (Griff.) Ding Hou
Hempedu beruang
Shrub to 2 m tall; lowland and hill forest; widespread.
- 6.2 *Thottea grandiflora* Rottb.
Hempedu beruang
Shrub to 2 m tall; lowland and hill forest to 600 m; widespread.

- 7.0 Celastraceae** Tree to 20 m tall; lowland forest; quite widespread.
- 7.1 *Bhesa paniculata* Arn.
Biku-Biku Tree to 20 m tall; lowland and montane forest to 1300 m; widespread.
- 7.2 *Euonymus javanicus* Blume Tree to 20 m tall; lowland and hill forest to 400m; widespread.
- 8.0 Chrysobalanaceae**
- 8.1 *Atuna nannodes* (Kosterm.) Kosterm.
Geranam Tree to 20 m tall; lowland and hill forest to 750 m altitude; widespread.
- 8.2 *Licania splendens* (Korth.) Prance
Membatu Tree to 10 m tall; lowland forest; throughout.
- 8.3 *Parinari elmeri* Merr.
Merbatu, Mempari Tree to 20 m tall; lowland and hill forest to 600 m altitude; an element of the south of Peninsular Malaysia.
- 9.0 Combretaceae**
- 9.1 *Terminalia calamansanai* (Blanco) Rolfe
Jelawai Mentalun Tree to 20 m tall; lowland forest; normally found in the north of Peninsular Malaysia and its occurrence in Ayer Hitam Forest Reserve is phytogeographically interesting.
- 9.2 *Terminalia foetidissima* Griff.
Jelawai Mempelam Babi Tree to 20 m tall; lowland forest; an element of the southern part of Peninsular Malaysia.
- 9.3 *Terminalia phellocarpa* King
Tree to 20 m tall; more commonly found in swamp or alluvial forests; widespread.
- 9.4 *Terminalia subspathulata* King
Jelawai Jaha Large tree to 30 m tall; lowland forest.
- 10.0 Ctenolophonaceae**
- 10.1 *Ctenolophon parvifolius* Oliv.
Mertas Buttressed tree reaching 30 m tall; hilly forest below 300 m, also in swamps; widespread.
- 11.0 Dilleniaceae**
- 11.1 *Dillenia reticulata* King var. *reticulata*
Simpoh Gajah Stilt-rooted tree to 20 m tall; lowland forest, widespread; an endemic variety.
- 11.2 *Dillenia sumatrana* Miq.
Simpoh Padang Tree to 20 m tall; lowland forest; quite widespread.
- 12.0 Dipterocarpaceae**
- 12.1 *Anisoptera costata* Korth.
Mersawa Huge tree; lowland forest; widespread.
- 12.2 *Anisoptera curtisii* Dyer ex King
Mersawa Kuning Large buttressed tree; lowland and hill forest to 700 m; widespread but more common in the north of Peninsular Malaysia.
- 12.3 *Anisoptera laevis* Ridley
Mersawa Durian Big tree; lowland forest; widespread.
- 12.4 *Dipterocarpus crinitus* Dyer
Keruing Mempelas Tree; lowland and hill forest to 850 m; widespread.
- 12.5 *Dipterocarpus verrucosus* Foxw. ex Slooten
Keruing Merah Tree; lowland forest; more common in the south of Peninsular Malaysia.
- 12.6 *Hopea beccariana* Burck
Merawan Batu Large buttressed tree; lowland and hill forest to 1200 m; widespread.
- 12.7 *Shorea acuminata* Dyer
Meranti Rambai Daun Large buttressed tree to 40 m tall; lowland forest; known previously from Perak and Terengganu, hence constituting a new record for Selangor.
- 12.8 *Shorea hopeifolia* (F. Heim) Symington
Damar Siput Jantan Very tall buttressed tree; lowland forest to 600 m; quite widespread.
- 12.9 *Shorea laevis* Ridley
Balau Kumus Large buttressed tree; lowland and hill forest to 1000 m; widespread.
- 12.10 *Shorea macroptera* Dyer
Meranti Melantai Large tree; lowland and hill forest to 900 m; widespread.
- 12.11 *Shorea multiflora* (Bruck) Symington
Damar Hitam Small to medium sized tree; lowland and hill forest to 700 m; throughout.
- 12.12 *Shorea parvifolia* Dyer ssp. *parvifolia*
Meranti Sarang Punai Large tree; common in lowland and hill forest to 800 m; widespread.

- 12.13 *Vatica cinerea* King
Resak Laut
Small to medium sized tree; lowland and hill forest to 600 m, including limestone hill forest; previously known from the northern states of Peninsular Malaysia including Pulau Langkawi.
- 12.14 *Vatica cuspidata* (Ridley) Symington
Resak Daun Runcing
Medium to large tree; lowland ridge forest often near the sea; widespread; endemic to Peninsular Malaysia.
- 12.15 *Vatica maingayi* Dyer
Resak
Tree; lowland forest to 500 m; widespread.
- 12.16 *Vatica odorata* (Griff.) Symington
Resak Bukit
Tree; lowland forest, mostly coastal; quite widespread.
- 12.17 *Vatica stapfiana* (King) Slooten
Resak
Medium sized tree; lowland forest; widespread.
- 13.0 **Ebenaceae**
- 13.1 *Diospyros adenophora* Bakh.
Kayu Arang
Tree to 10 m tall; lowland forest, also on limestone hill forest; endemic to Peninsular Malaysia but quite widespread.
- 13.2 *Diospyros areolata* King & Gamble
Kayu Arang, Merbatu
Tree to 30 m tall; lowland and hill forest to 700 m; widespread.
- 13.3 *Diospyros argentea* Griff.
Kayu Arang
Tree to 10 m tall; lowland and hill forest to 800 m; endemic to Peninsular Malaysia but widespread.
- 13.4 *Diospyros lanceifolia* Roxb.
Nyalin, Kayu Arang
Tree to 20 m tall; lowland and hill forest to 700 m; throughout.
- 13.5 *Diospyros maingayi* (Hiern.) Bakh.
Kayu Arang
Tree to 30 m tall; lowland and hill forest to 600 m; widespread.
- 13.6 *Diospyros sumatrana* Miq.
Kayu Arang
Tree to 30 m tall; lowland to montane forest at 1500 m; common throughout.
- 13.7 *Diospyros venosa* Wall. ex A. DC. var. *venosa*
Kayu Arang
Tree to 20 m tall; lowland to lower montane forest at 1300 m; throughout.
- 14.0 **Elaeocarpaceae**
- 14.1 *Elaeocarpus ferrugineus* (Jack) Steud ssp. *ferrugineus*
Mendung
Tree to 20 m tall; lowland to lower montane forest at 1200 m; common throughout.
- 14.2 *Elaeocarpus mastersii* King
Mendung
Tree to 20 m tall; lowland to montane forest at 2000 m; common throughout.
- 14.3 *Elaeocarpus nitidus* Jack var. *nitidus*
Mendung
Tree to 20 m tall; lowland to montane forest at 1500 m; common throughout.
- 14.4 *Elaeocarpus pedunculatus* Wall. ex Mast.
Mendung
Tree to 20 m tall; lowland and hill forest to 670 m; common throughout.
- 14.5 *Elaeocarpus pseudopaniculatus* Corner
Mendung
Tree to 10 m tall; a species which is known from the montane forest, especially At Fraser Hill and G. Tahan, its occurrence in the lowland forest of Selangor is both botanically and geographically interesting.
- 15.0 **Euphorbiaceae**
- 15.1 *Agrostistachys longifolia* (Wight) Benth. var. *leptostachya* (Pax & K. Hoffm.) Whitmore
Jejulung
Small tree to 10 m tall; lowland to lower montane forest at 1050 m; throughout.
- 15.2 *Antidesma cuspidatum* Mull. Arg.
Berunai
Small tree; lowland forest; common throughout.
- 15.3 *Aporosa microstachya* (Tul.) Mull. Arg.
Nipis Kulit
Tree; hillsides in lowland forest to 400 m; quite widespread.
- 15.4 *Austrobuxus nitidus* Miq. var. *nitidus*
Tree to 20 m tall; lowland forest, including coastal forest, swamps, mountains; throughout.
- 15.5 *Baccaurea maingayi* Hook.f.
Tampoi
Tree to 20 m tall; hill forest; quite widespread but was not reported from Selangor before.
- 15.6 *Baccaurea parviflora* (Mull.Arg.) Mull.Arg.
Asam Tambun

- Small tree to 5 m tall; lowland and hill forest to 600 m; widespread, more common in the north of Peninsular Malaysia.
- 15.7 *Blumeodendron griffithii* Hook.f.
Geraham Badak
Small tree, or sometimes reaching 20 m tall; hills to plains; throughout.
- 15.8 *Blumeodendron kurzii* (Hook.f.) J.J. Smith
Geraham Badak
Tree to 10 m tall; lowland forest; quite widespread.
- 15.9 *Blumeodendron tokbrai* (Blume) J.J. Smith
Geraham Badak
Tree to 20 m, sometimes stilt-rooted; lowland forest to 450 m, often in swamps; widespread.
- 15.10 *Bridelia stipularis* (L.) Blume
Kenidai
Shrub or small tree; normally in open country, often near streams; scattered throughout.
- 15.11 *Drypetes pendula* Ridley
Lidah-Lidah
Tree to 20 m tall; lowland forest; common throughout.
- 15.12 *Elateriospermum tapos* Blume
Perah Ikan
Tree to 30 m tall; lowland and hill forest to 600 m; throughout.
- 15.13 *Endospermum diadenum* (Miq.) Airy Shaw
Sesenduk
Tree to 30 m tall; lowland to lower montane forest at 1000 m; common throughout.
- 15.14 *Glochidion hypoleucum* (Miq.) Boerl.
Minyak Beruk
Shrub or small tree to 5 m tall; lowland to lower montane forest at 1200 m; throughout.
- 15.15 *Macaranga gigantea* (Rchb.f. & Zoll.) Mull.Arg.
Kubin
Tree to 15 m tall; common in disturbed lowland forest; throughout.
- 15.16 *Macaranga hosei* King ex Hook.f.
Mahang
Tree to 20 m tall; lowland forest; common throughout.
- 15.17 *Macaranga hypoleuca* (Rchb.f. & Zoll.) Mull.Arg.
Mahang Putih
Tree to 30 m tall; very common in secondary forest, especially along the forest edges; throughout.
- 15.18 *Macaranga triloba* (Blume) Mull.Arg.
Mahang Merah
Small tree; lowland forest including secondary growth; common throughout. Dr. T. C. Whitmore (pers. comm. 2000) said the correct name for this species is *M. bancana*, *M. triloba* as delimited is strictly a Javanese species.
- 15.19 *Mallotus penangensis* Mull.Arg.
Balik Angin
Tree to 15 m tall; lowland to lower montane forest at 1000 m; throughout; endemic to Peninsular Malaysia.
- 15.20 *Ptychopyxis costata* Miq. var. *costata*
Mendaruh
Tree to 4 m tall; lowland forest; supposedly very rare as it is previously known once from Sg. Kerian, Perak.
- 15.21 *Sapium baccatum* Roxb.
Ludai
Tree to 30 m tall; lowland and hill forest to 600 m; throughout.
- 16.0 Fagaceae**
- 16.1 *Castanopsis schefferana* Hance
Berangan
Tree to 20 m tall; lowland forest; widespread.
- 16.2 *Lithocarpus conocarpus* (Oudem.) Render
Mempening
Tree to 30 m tall; lowland to montane forest at 1800 m; quite widespread.
- 16.3 *Lithocarpus cyclophorus* (Endl.) A. Camus
Mempening
Tree to 30 m tall; normally found in montane forest to 1800 m; widespread.
- 16.4 *Quercus argentata* Korth.
Mempening
Tree to 20 m tall; lowland to montane forest; quite widespread.
- 16.5 *Quercus gemelliflora* Blume
Mempening
Tree to 20 m tall; lowland to lower montane forest; widespread.
- 17.0 Flacourtiaceae**
- 17.1 *Casearia capitellata* Blume
Shrub or small tree to 4 m tall; lowland forest; quite widespread.
- 17.2 *Flacourtia rukam* Zoll. & Moritz
Rukam
Small thorny tree; lowland forest; widespread.

- 17.3 *Homalium dictyoneurum* (Hance) Warb.
Telur Buaya
Tree to 20 m tall; lowland forest; quite widespread.
- 17.4 *Homalium longifolium* Benth.
Bunga Gambi
Tree to 30 m tall; lowland forest; widespread.
- 18.0 **Guttiferae**
- 18.1 *Calophyllum alboramulum* P.F. Stevens
Bintangor
Tree to 20 m tall; lowland forest; it is a rare species as it is previously known from Johore only.
- 18.2 *Calophyllum dioscurii* P.F. Stevens
Bintangor
Tree to 20 m tall; lowland forest; widespread.
- 18.3 *Calophyllum rubiginosum* M.R. Hend. & Wyatt-Smith
Bintangor Karat
Tree to 20 m tall; lowland forest; quite widespread.
- 18.4 *Calophyllum tetrapterum* Miq. var. *tetrapterum*
Bintangor Kuning Daun Kecil
Tree to 20 m tall; widespread.
- 18.5 *Calophyllum wallichianum* Planch. & Triana var. *incrasstum* M.R. Hend. & Wyatt-Smith
Bintangor Daun Panjang
Tree to 20 m tall; lowland forest; widespread.
- 18.6 *Cratoxylum arbrescens* (Vahl) Blume
Geronggang
Tree to 30 m tall; common in lowland swamp forest, also in the hills; widespread.
- 18.7 *Cratoxylum sumatranum* (Jack) Blume
Derum
Tree to 10 m tall; lowland forest; it is a rare species as it is previously known once each from Terengganu and Selangor.
- 18.8 *Garcinia burkillii* Whitmore
Kandis
Tree to 15 m tall; lowland to lower montane forest, 420-600 m; endemic to central part of the peninsula.
- 18.9 *Garcinia cowa* Roxb.
Kandis
Tree occasionally to 20 m tall; lowland forest mostly; widespread.
- 18.10 *Garcinia malaccensis* Hook.f.
Manggis Hutan
Tree to 20 m tall; lowland forest to 540 m; quite widespread.
- 18.11 *Garcinia nigrolineata* Planch. ex T. Anderson
Kandis
Tree; lowland forest to 600 m; common throughout.
- 18.12 *Garcinia parvifolia* (Miq.) Miq.
Kandis
Tree to 20 m tall; lowland forest to 600 m; common throughout.
- 18.13 *Mesua ferrea* L.
Penaga Lilin
Tree to 20 m tall; lowland forest to 480 m; throughout but more common in the north of Peninsular Malaysia.
- 18.14 *Mesua lepidota* T. Anderson var. *lepidota*
Penaga Sabut
Tree to 20 m tall; lowland forest.
- 18.15 *Mesua racemosa* (Planch. ex Triana) Kostermans
Penaga Tikus
Tree to 20 m tall; more common in lowland forest; widespread.
- 19.0 **Hamamelidaceae**
- 19.1 *Exbucklandia populnea* (R. Br. ex Griff.) R. W. Br.
Geruk
A species normally found in lower montane forests and its occurrence in lowland forest of Ayer Hitam is interesting.
- 20.0 **Icacinaceae**
- 20.1 *Stenomerus malaccensis* (Mast.) Sleumer
Derhaka Mertua
Tree to 20 m tall; lowland and hill forest to 1300 m; throughout.
- 21.0 **Irvingiaceae**
- 21.1 *Irvingia malayana* Oliv. ex Benn.
Pauh Kijang
Tree to 40 m tall; lowland forest; widespread.
- 22.0 **Ixonanthaceae**
- 22.1 *Ixonanthes icosandra* Jack
Pagar Anak
Tree to 30 m tall; found in primary and secondary forest, mostly lowlands; throughout.
- 22.2 *Ixonanthes reticulata* Jack
Inggir Burung
Tree to 30 m tall; lowland and hill forest; throughout.
- 23.0 **Lauraceae**
- 23.1 *Actinodaphne sphaerocarpa* (Blume) Nees
Medang Payung
Tree to 20 m tall; lowlands and it is an

- element of the northern part of Peninsular Malaysia.
- 23.2 *Alseodaphne foxiana* (Gamble) Kosterm.
Medang
Tree to 15 m tall; montane forest above 1000 m; endemic to Peninsular Malaysia and quite widespread.
- 23.3 *Alseodaphne nigrescens* (Gamble) Kosterm.
Medang
Small tree to 10 m tall; lowland to montane forest; widespread.
- 23.4 *Beilschmiedia dictyoneura* Kosterm.
Medang
Tree to 30 m tall; lowland to lower montane forest at 1000 m; widespread.
- 23.5 *Beilschmiedia glabra* Kosterm.
Medang
Tree to 20 m tall; lowland and hill forest to 900 m; previously known from Pahang and Johore.
- 23.6 *Cryptocarya rugulosa* Hook.f.
Medang
Tree to 30 m tall; lowland and hill forest; widespread.
- 23.7 *Litsea grandis* (Wall. ex Nees) Hook.f.
Medang Daun Besar
Tree to 20 m tall; lowland and montane forest to 1500 m; widespread.
- 24.0 **Lecythidaceae**
- 24.1 *Barringtonia macrostachya* (Jack) Kurz
Putat
Tree to 20 m tall; lowland forest, rarely in the mountains; throughout.
- 25.0 **Leguminosae**
- 25.1 *Adenanthera malayana* Kosterm.
Saga Daun Tajam
Tree sometimes to 30 m tall; lowland and hill forest to 900 m; often planted in villages; widespread but scattered.
- 25.2 *Adenanthera pavonina* L.
Saga Daun Tumpul
Tree 20 m tall; lowland forest, usually near the sea; often planted in villages; wild on East Coast and offshore islands of Peninsular Malaysia.
- 25.3 *Albizia splendens* Miq.
Kungkur
Tree sometimes reaching 20 m tall; lowland and hill forest to 700 m; scattered throughout.
- 25.4 *Archidendron bulbalinum* (Jack) I.C. Nielsen
Kerdas
Tree to 20 m tall; lowland forest, often in secondary forest; the seeds are eaten with rice for flavour; widespread.
- 25.5 *Archidendron clypearia* (Jack) I.C. Nielsen
Jering
Shrub or tree to 20 m tall; more common in montane forest.
- 25.6 *Archidendron contortum* (Martelli) I.C. Nielsen
Petai Belalang
Shrub to small tree to 10 m tall; common in secondary forest, usually found in the beach forest; widespread.
- 25.7 *Callerya atropurpurea* (Wall.) Schot.
Tulang Daing
Tree to 20 m tall; open country, sometimes planted as ornamental plant; widespread.
- 25.8 *Dialium indum* L. var. *indum*
KerANJI Paya
Tree to 20 m tall; scattered in lowland forest; widespread.
- 25.9 *Dialium platysepalum* Baker
Tree to 30 m tall; scattered in the lowland forest; throughout.
- 25.10 *Intsia palembanica* Miq.
Merbau
Large buttressed tree to 40 m tall; common in lowland forest and produce valuable timber; throughout.
- 25.11 *Koompassia malaccensis* Maing. ex Benth.
Kempas
Big tree to 50 m tall; common in lowland and hill forest; throughout.
- 25.12 *Parkia singularis* Miq.
Petai Meranti
Tree to 20 m tall or more; lowland and hill forest to 500 m; widespread.
- 25.13 *Sindora echinocalyx* (Benth.) Prain
Sepetir Daun Nipis
Tree to 30 m tall or more; hill forest to 700 m; widespread.
- 26.0 **Loganiaceae**
- 26.1 *Fagraea racemosa* Jack ex Wall.
Tembusu
Tree; common in secondary forest, especially near the seashore; widespread.
- 26.2 *Norrisia malaccensis* Gardner
Tree to 30 m tall; lowland forest; widespread.
- 27.0 **Melastomataceae**
- 27.1 *Memecylon amplexicaule* Roxb.
Nipis Kulit
Tree to 15 m tall; lowland and hill forest to 1200 m; widespread.

- 27.2 *Memecylon campanulatum* C.B. Clarke
Nipis Kulit
Tree to 20 m tall; lowland forest; widespread.
- 27.3 *Memecylon caeruleum* Jack
Nipis Kulit
Shrub or small tree to 10 m tall; lowland forest; widespread.
- 27.4 *Memecylon floridum* Ridley
Nipis Kulit
Tree to 15 m tall; hill forest to 1200 m; endemic to Peninsular Malaysia but widespread.
- 27.5 *Memecylon megacarpum* Furtado
Nipis Kulit
Tree to 15 m tall; lowland to montane forest at 1800 m; widespread.
- 27.6 *Memecylon minutiflorum* Miq.
Tema
Tree to 25 m tall; lowland to montane forest at 1800 m; widespread.
- 27.7 *Memecylon paniculatum* Jack
Nipis Kulit
Tree to 30 m tall; lowland and hill forest to 1200 m; widespread.
- 27.8 *Memecylon pubescens* (C.B. Clarke) King
Nipis Kulit
Tree to 30 m tall; lowland and hill forest to 1200 m; widespread.
- 27.9 *Memecylon wallichii* Ridley
Nipis Kulit
Small tree to 5 m tall; lowland and hill forest; endemic to Peninsular Malaysia and quite widespread.
- 27.10 *Pternandra coerulescens* Jack
Nipis Kulit
Tree to 15 m tall; lowland and hill forest; widespread.
- 27.11 *Pternandra echinata* Jack
Sial Menahun
Tree to 15 m tall; lowland and hill forest to 1200 m; widespread.
- 28.0 **Meliaceae**
- 28.1 *Aglaia edulis* (Roxb.) Wall.
Pasak
Tree to 20 m tall; lowland and hill forest; quite widespread.
- 28.2 *Chisocheton patens* Blume
Memberas
Tree to 20 m tall; lowland forest; widespread.
- 28.3 *Chisocheton tomentosus* (Roxb.) Mabb.
Pasak
- Tree to 20 m tall; lowland and hill forest; widespread.
- 28.4 *Sandoricum koetjape* (Burm.f.) Merr.
Sentul
Tree to 30 m tall; lowland and hill forest, and more common near the shores; often cultivated in the villages for its edible fruits, widespread.
- 29.0 **Menispermaceae**
- 29.1 *Fibraurea tinctoria* Lour.
Large liana to 20 m long; lowland and hill forest margins; widespread and common.
- 30.0 **Moraceae**
- 30.1 *Artocarpus dadah* Miq.
Pudu
Tree to 20 m tall; lowland and hill forest; throughout.
- 30.2 *Artocarpus elasticus* Reinw. ex Blume
Terap Nasi
Tree to 20 m tall; lowland and hill forest; throughout.
- 30.3 *Artocarpus integer* (Thunb.) Merr. var. *silvestris* Corner
Cempedak
Tree to 20 m tall; lowland to montane forest; widespread.
- 30.4 *Artocarpus lanceifolius* Roxb.
Keledang
Tree to 30 m tall; lowland and hill forest; widespread.
- 30.5 *Streblus elongatus* (Miq.) Corner
Tempinis
Tree to 20 m tall; lowland forest; widespread.
- 31.0 **Myristicaceae**
- 31.1 *Gymnancranthera farquhariana* (Hook.f. & Thomson) Ward. var. *eugeniifolia* (A.DC.) R.T.A. Schouten
Penarahan
Tree to 20 m tall; lowland and hill forest to 1300 m; widespread.
- 31.2 *Horsfieldia fulva* (King) Warb.
Penarahan
Tree to 20 m tall; lowland forest; quite widespread.
- 31.3 *Horsfieldia irya* (Gaertn.) Warb.
Penarahan
Tree to 20 m tall; lowland forest; widespread.
- 31.4a *Horsfieldia polyspherula* (Hook.f.) J. Sinclair var. *polyspherula*
Penarahan
Tree to 30 m tall; lowland forest; widespread.

- 31.4b *Horsfieldia polyspherula* (Hook.f.) J. Sinclair
var. *sumatrana* (Miq.) W.J. de Wilde
Penarahan
Tree to 30 m tall; lowland forest;
widespread.
- 31.5 *Horsfieldia ridleyana* (King) Warb.
Penarahan
Tree to 20 m tall; lowland forest on poor
soils; widespread.
- 31.6 *Horsfieldia sucosa* (King) Warb.
Penarahan
Tree to 20 m tall; lowland forest;
widespread.
- 31.7 *Knema curtisii* (King) Warb. var. *curtisii*
Penarahan Daun Kecil
Tree to 10 m tall; lowland forest;
widespread.
- 31.8 *Knema furfuracea* (Hook.f. & Thomson)
Warb.
Penarahan Arang
Tree to 20 m tall; lowland forest;
widespread.
- 31.9 *Knema glauca* (Blume) Warb.
Penarahan
Tree to 20 m tall; lowland forest; quite
widespread.
- 31.10 *Knema hookeriana* (Wall. ex Hook.f. &
Thomson) Warb.
Penarahan
Tree to 20 m tall; lowland and hill forest;
widespread.
- 31.11 *Knema intermedia* (Blume) Warb.
Penarahan
Tree to 10 m tall; lowland forest;
widespread.
- 31.12 *Knema kunstleri* (King) Warb.
Penarahan
Tree to 10 m tall; lowland and hill forest
on poor soils; widespread.
- 31.13 *Knema latericia* Elmer ssp. *ridleyi* (Gand.)
W.J. de Wilde
Penarahan
Tree to 10 m tall; lowland forest; quite
widespread.
- 31.14 *Knema laurina* (Blume) Warb. var. *laurina*
Penarahan
Small tree; lowland forest; widespread.
- 31.15 *Knema malayana* Warb.
Penarahan
Tree to 15 m tall; lowland forest;
widespread.
- 31.16 *Knema oblongifolia* (King) Warb.
Penarahan
- Tree to 10 m tall; endemic to Peninsular
Malaysia and quite widespread.
- 31.17 *Knema patentinervia* (J. Sinclair) W.J. de
Wilde
Penarahan
Tree to 15 m tall; lowland forest;
widespread.
- 31.18 *Knema pseudolaurina* W.J. de Wilde
Penarahan
Tree; lowland forest; widespread.
- 31.19 *Knema scortechinii* (King) J. Sinclair
Penarahan Arang
Tree to 20 m tall; lowland forest;
widespread.
- 31.20 *Knema stenophylla* (Warb.) J. Sinclair
Penarahan
Tree to 10 m tall; lowland forest;
widespread.
- 31.21 *Myristica iners* Blume
Penarahan
Tree to 20 m tall; lowland forest; common
throughout.
- 31.22 *Myristica malaccensis* Hook.f.
Penarahan
Tree; lowlands; widespread.
- 32.0 Myrsinaceae**
- 32.1 *Ardisia crassa* C.B. Clarke
Sem Babui
Small tree; lowland forest; a southern
element of Peninsular Malaysia.
- 33.0 Myrtaceae**
- 33.1 *Rhodamnia cinerea* Jack
Mempoyan
Tree to 15 m tall; quite common in the
lowland forest, especially in the secondary
forest near the sea; common throughout.
- 33.2 *Syzygium borneense* (Miq.) Miq.
Kelat
Tree to 15 m tall; lowland forest.
- 33.3 *Syzygium claviflorum* (Roxb.) ex Wall. var.
claviflorum Cowan & Cowan
Kelat
Medium sized tree; lowland and hill forest;
widespread.
- 33.4 *Syzygium politum* (King) I. M. Turner
Kelat Merah
Shrub or small tree sometimes to 20 m
tall; lowland and hill forest; endemic to
Peninsular Malaysia and widespread.
- 33.5 *Syzygium pseudocrenulatum* (M.R. Hend.)
I.M. Turner
Kelat
Stilt-rooted tree to 20 m tall; lowland

- forest; endemic to Peninsular Malaysia but widespread.
- 33.6 *Syzygium pyrifolium* (Blume) D.C.
Kelat
Tree to 15 m tall; lowlands; widespread.
- 33.7 *Syzygium rugosum* Korth. var. *rugosum*
Kelat
Tree to 20 m tall; lowland and hill forest; widespread.
- 33.8 *Syzygium syzigioides* (Miq.) Merr. & L.M. Perry
Kelat
Tree to 20 m tall; lowlands, often coastal; common throughout.
- 34.0 Ochnaceae**
- 34.1 *Brackenridgea hookeri* (Planch.) A.Gray
Tree to 20 m tall; lowland and hill forest to 1000 m; throughout.
- 34.2 *Campylospermum serratum* (Gaertn.) Bittrich & M.C.E. Amaral
Mata Ketam
Tree to 20 m tall; lowland and hill forest to 1000 m; common near the sea; throughout.
- 35.0 Olacaceae**
- 35.1 *Ochanostachys amentacea* Mast.
Petaling
Tree to 20 m tall; lowland and hill forest to 900 m; widespread.
- 35.2 *Scorodocarpus borneensis* (Baill.) Becc.
Bawang Hutan
Tree reaching to 30 m tall; its bark smells of garlic; lowland forest; widespread.
- 35.3 *Strombosia ceylanica* Gardner
Kamap
Tree to 20 m tall; lowland forest; widespread.
- 35.4 *Strombosia javanica* Blume
Dedali
Tree to 20 m tall; lowland forest; widespread.
- 36.0 Oxalidaceae**
- 36.1 *Sarcotheca griffithii* (Planch. ex Hook.f.) Hallier f.
Belimbing Pipit
Tree to 20 m tall; lowland forest; widespread.
- 36.2 *Sarcotheca monophylla* (Planch. ex Hook.f.) Hallier f.
Pupoi
Tree to 20 m tall; lowland forest; endemic and widespread.
- 37.0 Pandaceae**
- 37.1 *Galearia fulva* (Tul.) Miq.
Small tree; lowland and hill forest to 690; throughout.
- 38.0 Polygalaceae**
- 38.1 *Xanthophyllum affine* Korth. ex Miq.
Minyak Beruk
Tree to 20 m tall; usually smaller; lowlands and mountains; widespread.
- 38.2 *Xanthophyllum amoenum* Chodat
Minyak Beruk
Tree to 30 m tall; lowland and hill forest; widespread.
- 38.3 *Xanthophyllum eurhynchum* Miq. ssp. *maingayi* (Hook.f. ex A.W. Benn.) Meijden
Minyak Beruk
Shrub or tree to 20 m tall; lowland to mountains, forest understory; widespread.
- 38.4 *Xanthophyllum griffithii* Hook.f. ex A.W. Benn ssp. *erectum* Meijden
Minyak Beruk
- 38.5 *Xanthophyllum stipitatum* A.W. Benn.
Minyak Beruk
Tree to 30 m tall; lowland and hill forest, usually on ridges; widespread.
- 38.6 *Xanthophyllum vitellinum* (Blume) Dietr.
Minyak Beruk
Tree to 30 m tall; lowland to lower montane forest; widespread.
- 39.0 Rhizophoraceae**
- 39.1 *Carallia eugenioidea* King
Meransi Mata Keli
Shrub or small tree to 20 m tall; montane forests above 1200 m; previously not known from Selangor.
- 39.2 *Pellacalyx axillaris* Korth.
Membuluh
Tree to 20 m tall; damp or wet lowland or hill forest; widespread.
- 39.3 *Pellacalyx saccardianus* Scort.
Membuluh
Tree to 20 m tall; lowland and hill forest to 900 m; widespread; endemic to Peninsular Malaysia.
- 40.0 Rosaceae**
- 40.1 *Prunus arborea* (Blume) Kalkman var. *arborea*
Pijat
Tree to 20 m tall; lowland to lower montane forest at 1300 m; widespread.
- 41.0 Rubiaceae**
- 41.1 *Acranthera pulchella* (Ridley) K.M. Wong
Shrub; lower montane forest; endemic and previously known from Perak and Pahang.

- 41.2 *Aidia densiflora* (Wall.) Masam.
Mentiong
Small tree to 15 m tall; lowland to montane forest; throughout.
- 41.3 *Diplospora malaccensis* Hook.f.
Kopi Hutan
Tree to 15 m tall; lowland to montane forest at 1500 m; throughout.
- 41.4 *Ixora javanica* (Blume) DC. var. *retinervia*
Corner
Shrub or small tree to 5 m tall; lowland and hill forest to 1000 m; widespread; an endemic variety.
- 41.5 *Nauclea officinalis* (Pierre ex Pit.) Merr. & Chun
Mengkal
Tree to 20 m tall; lowland and hill forest; throughout.
- 41.6 *Pertusadina eurhyncha* (Miq.) Ridsdale
Latticed tree to 20 m tall; lowland and hill forest to 400 m; scattered.
- 41.7 *Porterandia anisophyllea* (Jack ex Roxb.) Ridley
Tinjau Belukar
Tree to 10 m tall; lowland and hill forest; widespread.
- 41.8 *Psydrax maingayi* (Hook.f.) Bridson
Tree to 15 m tall; lowland to lower montane forest; endemic to Peninsular Malaysia and widespread.
- 41.9 *Psydrax nitidum* (Craib) K.M. Wong
Mentulang
Small tree to 5 m tall; lowland forest including that on limestone hill forest at Pulau Langkawi.
- 41.10 *Timonius compressicaulis* (Miq.) Boerl.
Shrub or small tree to 5 m tall; normally found on sandy and rocky shores; its occurrence in the Ayer Hitam FR is botanically noteworthy.
- 41.11 *Timonius wallichianus* (Korth.) Valetton
Timun
Tree to 5 m tall; lowland forests, common in secondary vegetation; widespread.
- 41.12 *Urophyllum glabrum* Wall.
Shrub or small tree to 5 m tall; lowland to lower montane forest at 1000 m; throughout.
- 42.0 Rutaceae**
- 42.1 *Glycosmis chlorosperma* Spreng var. *chlorosperma*
Shrub; lowland to montane forest; widespread.
- 42.2 *Maclurodendron porteri* (Hook.f.) T.G. Hartley
Merlimau
Tree to 20 m tall; lowland to lower montane forest; throughout.
- 42.3 *Melicope glabra* (Blume) T.G. Hartley
Pepauh
Tree to 20 m tall; lowland forest; widespread.
- 43.0 Sapotaceae**
- 43.1 *Madhuca decipiens* J. Sinclair
Nyatoh
Tree to 20 m tall; lowland forest, previously known from Johore.
- 43.2 *Madhuca malaccensis* (C.B. Clarke) H.J. Lam.
Nyatoh
Tree to 20 m tall; lowland forest; widespread.
- 43.3 *Madhuca selangorica* (King & Gamble) J. Sinclair
Nyatoh
Tree to 15 m tall; lowland forest; endemic to the central part of Peninsular Malaysia, especially Selangor.
- 43.4 *Madhuca utilis* (Ridley) H.J. Lam
Bitis
Tree to 20 m tall; lowland forest; widespread.
- 43.5 *Palaquium gutta* (Hook.f.) Baill.
Nyatoh Taban Merah
Tree to 20 m tall; lowland and hill forest; widespread.
- 43.6 *Palaquium rostratum* (Miq.) Burck
Nyatoh Sidang
Tree to 30 m tall; lowland to montane forest; widespread.
- 43.7 *Payena maingayi* C.B. Clarke
Nyatoh Durian
Tree to 30 m tall; lowland forest; endemic to Peninsular Malaysia and widespread.
- 43.8 *Pouteria malaccensis* (C.B. Clarke) Baehni
Nyatoh Nangka Kuning
Tree to 30 m tall; lowland to lower montane forest; throughout.
- 44.0 Simaroubaceae**
- 44.1 *Eurycoma longifolia* Jack
Tongkat Ali
Tree to 5 m tall; lowlands and hills; throughout.
- 44.2 *Eurycoma apiculata* Benn.
Tongkat Ali
Tree to 5 m tall; usually in the mountains; about 1200 m; widespread.

45.0 Sterculiaceae

45.1 *Pterygota alata* (Roxb.) R. Br.
Tree to 30 m tall; lowland forests near rivers; widespread.

45.2 *Scaphium longiflorum* Ridley
Kembang Semangkuk Jantung
Tree to 30 m tall; swampy lowland forest; endemic and widespread.

45.3 *Sterculia parvifolia* Wall. ex R.Br.
Kelumpang
Small tree to 10 m tall; hill forest; quite widespread.

46.0 Theaceae

46.1 *Gordonia maingayi* Dyer
Kadeng
Tree to 15 m tall; lowland to montane forest at 1600 m; endemic to Peninsular Malaysia and widespread.

46.2 *Gordonia scortechinii* King
Pagar anak
Tree; lowland forest; endemic and previously known from Perak and Pahang, hence it is a new record for Selangor.

46.3 *Ternstroemia bancana* Miq.
Tree to 20 m tall; lowland forest to 500 m; widespread.

47.0 Thymelaeaceae

47.1 *Aquilaria malaccensis* Lam.
Karas
Tree to 30 m tall; lowland and hill forest to 750 m; widespread.

47.2 *Gonystylus affinis* Radlk.
Ramin
Tree to 30 m tall; lowland forest to 330 m; widespread.

47.3 *Gonystylus bancanus* (Miq.) Kurz.
Ramin Dara Elok
Tree to 20 m tall; more common in the lowland peat swamp forest.

47.4 *Gonystylus maingayi* Hook.f.
Ramin
Tree to 30 m tall; lowland forest; widespread.

48.0 Tiliaceae

48.1 *Microcos antidesmifolia* (King) Burret
Chenderai
Tree to 10 m tall; lowland forest, often near rivers; widespread.

48.2 *Microcos lanceolata* (Miq.) Burret
Damak-Damak
Shrub or small tree; lowland forest; mostly found in the west coast states.

49.0 Trigoniaceae

49.1 *Trigoniastrum hypoleucum* Miq.
Marajali
Tree to 20 m tall; lowland forest; widespread.

50.0 Ulmaceae

50.1 *Girroniera nervosa* Planch.
Hampas Tebu
Tree to 35 m tall, usually smaller; lowland forest below 500 m; widespread.

50.2 *Girroniera parvifolia* Planch.
Hampas Tebu Licin
Tree to 20 m tall; lowland and hill forest to 900 m; widespread.

50.3 *Trema cannabina* Lour.
Shrub or small tree to 10 m tall; secondary forest to 1000 m; throughout.

50.4 *Trema orientalis* (L.) Blume
Mengkirai
Tree to 5 m tall; lowlands and hills.

51.0 Verbenaceae

51.1 *Vitex gamosepala* Griff.
Leban
Tree to 10 m tall; lowland and hill forest to 1200 m; throughout.

51.2 *Vitex pinnata* L.
Leban
Tree to 20 m tall; disturbed forest.

Angiosperms – Monocotyledons

In this scientific expedition for unknown reasons not much attention was given to collecting and observing the monocotyledons.

52.0 Gramineae

52.1 *Centotheca lappacea* (L.) Desv.
Rosette-forming herb to 1 m tall; shady places to 1500m; widespread.

52.2 *Lophatherum gracile* Brongn.
Herb to 1 m tall often forming loose rosette; openings in forest to 1650 m; widespread.

52.3 *Panicum trigonum* Retz.
Grass herb; common.

53.0 Marantaceae

53.1 *Stachyphrynium griffithii* (Baker) K. Schum.
Herb; lowland forest; previously known from Perak, Pahang and southward; endemic.

54.0 Palmae

54.1 *Licuala* sp. (AZ 6743)

DISCUSSION

The Ayer Hitam FR is a logged-over lowland dipterocarp forest which is fast recovering towards its climax. It is obvious from the above checklist that it is preliminary because it was based on observation and collection during a brief expedition and it must be taken together with other similar efforts taken by the researchers from the Faculty of Forestry, Universiti Putra Malaysia (Faridah Hanum 1999). In the above study a total of 430 species in 203 genera and 72 families were accounted whereas in this checklist only 262 species (ca. 60.9%) belonging to 142 genera (70%) and 56 families (77.8%) were enumerated. It is obvious that when the above list is compared with the present one the common taxa was very high, implying that collections were done on the same taxa, and most likely in the similar habitats. In the present checklist the following families are not represented at all: Burseraceae, Piperaceae, Zingiberaceae, Sapindaceae, Compositae, Dioscoreaceae, Proteaceae, Araliaceae, Crypteroniaceae, Opiliaceae, Sonneratiaceae, Vitaceae, Leeaceae, Solanaceae, Cyperaceae and Orchidaceae.

In the current checklist there are a total of 56 families, 54 are angiosperms and two are gymnosperms, some are represented by a species while others are quite largely represented by more than five species. The size of the 10 largest families is given, with Myrtaceae as being the largest containing a total of 22 species in four genera (Table 1). The Dipterocarpaceae, Guttiferae and Myristicaceae are represented by smaller number of genera but many species. The other large families such as Euphorbiaceae and Rubiaceae both are represented by larger number of genera and species. In many similar studies, the families such as Euphorbiaceae, Annonaceae and Rubiaceae which are always dominant in lowland dipterocarp forests present in large number in this logged over forest. The genera *Macaranga* and *Mallotus* (Euphorbiaceae) contain many pioneer species of the disturbed forests.

With respect to the size of genera, *Knema* (Myristicaceae) a lowland forest dweller is the largest genus containing a total of 13 species. This is followed by *Memecylon* (Melastomataceae) with 9 species and by *Syzygium* (Myrtaceae) and *Diospyros* (Ebenaceae) each containing 7 species (Table 2). All these genera are common

TABLE 1

The size of 10 largest families in Ayer Hitam FR

Family	No. of genera	No. of species
Myrtaceae	4	22
Euphorbiaceae	15	21
Dipterocarpaceae	5	17
Annonaceae	7	14
Leguminosae	9	13
Guttiferae	4	13
Rubiaceae	10	12
Myristicaceae	2	11
Anacardiaceae	6	8
Ebenaceae	1	7

components of lowland dipterocarp forest in Peninsular Malaysia, and their occurrence in the Ayer Hitam FR is highly expected. However, *Syzygium* is also common in beach forest (Tami 1996) and hill dipterocarp forest (Shamsul 2001). It is worth noting that *Shorea* and *Dipterocarpus* (Dipterocarpaceae) are still present in moderate frequencies within the forest, although logging had taken place in the last 60 years or so. It is fair to assume that the trees belonging to these timber genera are remnants of the past logging operations or they were purposely left then as they did not attain their cutting limits. The other comparatively large genera are *Elaeocarpus* (Elaeocarpaceae), *Calophyllum* and *Garcinia* (Guttiferae).

TABLE 2

The size of 10 largest genera in Ayer Hitam FR

Genus	No. of species
<i>Knema</i>	13
<i>Memecylon</i>	9
<i>Syzygium</i>	7
<i>Diospyros</i>	7
<i>Xanthophyllum</i>	6
<i>Shorea</i>	6
<i>Vatica</i>	5
<i>Elaeocarpus</i>	5
<i>Calophyllum</i>	5
<i>Garcinia</i>	5

Patterns of Plant Distribution in Ayer Hitam FR

The species composition in Ayer Hitam FR is interesting from the botanical point of view. By far the most predominant are the elements of lowland dipterocarp forests but as the forest has been logged and silvicultural treatments had been carried out, some pioneer species and

introduced species are observed. Among the introduced species include *Podocarpus neriifolius* and weed species such as *Asystasia gangetica*, *Eupatorium odoratum* and *Mikania micrantha*.

Introduced Species

It seems only *Podocarpus neriifolius* is the only introduced species observed in the Ayer Hitam FR. Others are weedy species.

Peninsular Malaysian Endemics

In Peninsular Malaysia there are a total of 749 endemic tree species and the number of non-tree endemic species is not known. In Ayer Hitam FR there are 20 endemic species, viz. *Alphonsea lucida*, *Popowia fusca*, *Stachyphrynium griffithii*, *Gordonia maingayi*, *G. scortechnii*, *Scaphium longiflorum*, *Diospyros adenophora*, *D. argentea*, *Garcinia burkillii*, *Vatica cuspidata*, *Alseodaphne foxiana*, *Memecylon floridum*, *M. wallichianum*, *Knema oblongifolia*, *Syzygium politum*, *Pellacalyx saccardianus*, *Acranthera pulchella*, *Psydrax maingayi*, *Madhuca selangorica* and *Payena maingayi*. Most of these have a wide distribution except *Acranthera pulchella* and *Madhuca selangorica* which seem to be found in Selangor.

Rare Peninsular Malaysia Taxa

There are species which are known from very few collection records in Peninsular Malaysia and they are known to occur in Ayer Hitam FR. These include *Ptychopyxis costata* var. *costata*, *Calophyllum alboramulum*, *Cratoxylon sumatranum*, *Madhuca decipiens*, *Beilschmeidia glabra* and *Acranthera pulchella*. This directly proves that Ayer Hitam FR is one of the refugia habitats for these taxa and hence conservation of this forest is deemed more important. Similar phenomenon has been shown by Mat-Salleh (1999) for Bangi FR at Universiti Kebangsaan Malaysia.

Malaysian Montane Elements

These are taxa which are known to occur on the mountains of Peninsular Malaysia and are observed and collected in the lowland forest of Ayer Hitam FR. These include *Elaeocarpus pseudopaniculatus* and *Exbucklandia populnea*. These taxa have proved that they could adapt to the microclimate of the lowlands.

Southern Peninsular Malaysian Elements

Those taxa which are known to occur south of Selangor, i.e. found in Negeri Sembilan, Malacca

and Johore are termed the floristic elements of the south Peninsular Malaysia. Here, Selangor is taken as the mid-point between the south and north of peninsula. There are a few species which showed this pattern of distribution including *Parinari elmerii*, *Terminalia foetidissima* and *Ardisia crassa*.

Northern Peninsular Malaysian Elements

Conversely, all those taxa which are found north of Selangor, i.e. in Perak, Penang, Kedah and Perlis are termed as northern floristic elements. There are two species which showed this pattern of distribution including *Alphonsea curtisii* and *Terminalia calamansanai*.

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