

Freshwater Swamp Forest in Singapore, with Particular Reference to That Found Around the Nee Soon Firing Ranges

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Abstract

The freshwater swamp forest found around the firing ranges at Nee Soon is the last remaining area of this forest formation in Singapore. The vascular plant flora of freshwater swamp forest in Singapore is reviewed, with particular reference to the Nee Soon forest. Some preliminary soil, water and foliar analyses indicate that the swamp forest at Nee Soon may have considerably higher amounts of phosphorus available to the vegetation than the dryland forest of Bukit Timah Nature Reserve. Nitrogen and potassium availabilities appear to be similar at the two sites. The Nee Soon swamp forest is an extremely important site for Singapore's native biota and should receive the highest priority for conservation.

Introduction

One of the least well-known of the forest formations of West Malaysia is freshwater swamp forest. So named to distinguish it from the saltwater mangrove swamps, it is a forest type of wet, often seasonally flooded, lowland areas (Whitmore 1975). The only work of any note specifically concerning freshwater swamp in this region is Corner's (1978) account of his studies, which were mostly floristic in nature, of these forests in southeast Johore and Singapore. Corlett (1991) has estimated that approximately 5% of Singapore was covered in freshwater swamp before the major forest clearance of the nineteenth century began. The only remaining area of swamp forest in Singapore today is to be found around the Nee Soon Firing Ranges in the Central Catchment Nature Reserve (Fig. 1). The fauna of the Nee Soon forest and surrounding areas has been outlined by Ng and Lim (1992). Botanically, this area has never been studied closely, and it seems timely to consolidate our current knowledge of the forest into one publication.

The Nee Soon Swamp Forest

Swamp forest occurs in low-lying areas where slow-flowing streams drain shallow valleys. The ground becomes saturated with the water table close to the soil surface and there are often periods of flooding. Such swamps probably occurred historically in the upper reaches of all the rivers in Singapore (Corlett 1991). Corner (1978) made detailed studies of the flora and forest structure of the swamp forest near Mandai Road, which is now submerged beneath Upper Seletar Reservoir, and in Jurong. Industrial and housing development have totally destroyed the Jurong swamps. This leaves the Nee Soon swamp as the last remnant of the forest formation in Singapore. It has probably survived because of the Firing Ranges, which lack

baffling walls or banks, making the surrounding area dangerous to the public and unsuitable for any form of development. The approximate extent of the swamp forest is shown in Figure 1. This has been delineated from data collected by a number of field researchers, particularly D.H. Murphy who has mapped many of the main streams of the area. It is estimated that the swamp forest covers about 87 ha, though much of this has been disturbed quite heavily at various times in the past. There is concern that changes in the drainage regime of the forest may be causing excessive soil erosion along some of the streams and causing the death of the larger trees in certain areas (D.H. Murphy pers. comm.).

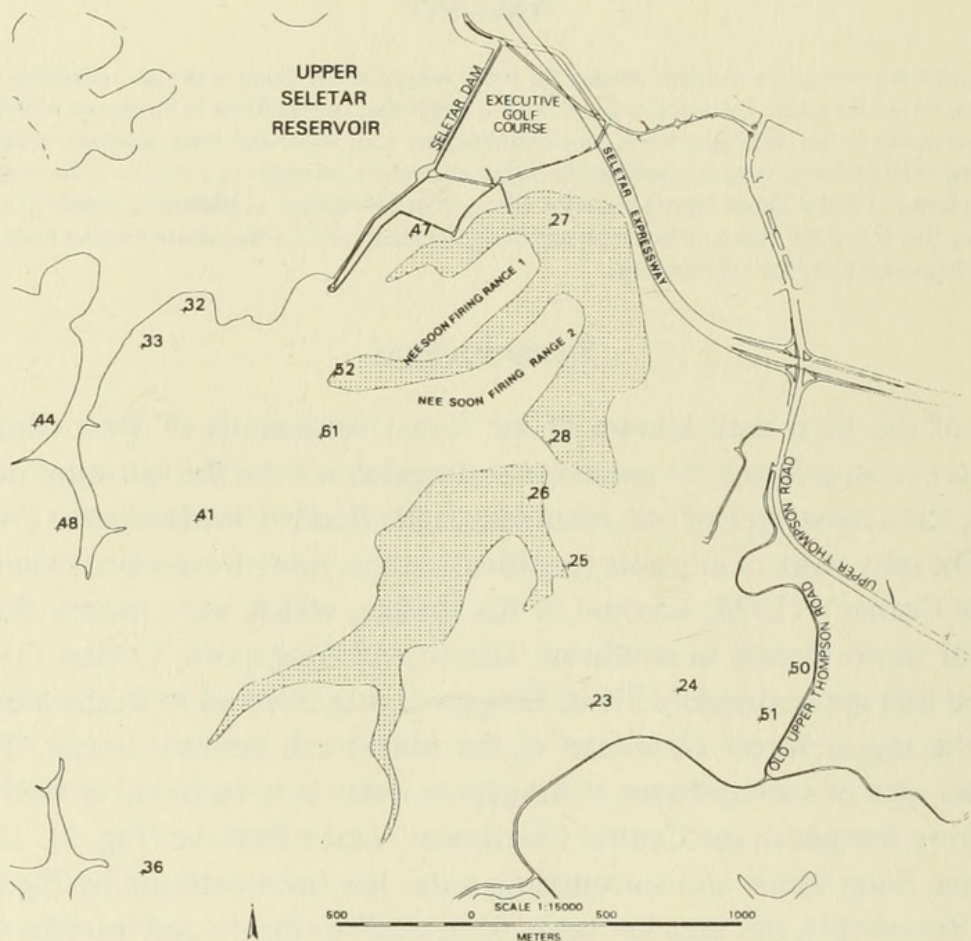


Figure 1. Map showing the location of the Nee Soon Freshwater Swamp Forest, Singapore. The stippled area indicates the approximate extent of the swamp forest.

Floristics

Appendix 1 gives a list of vascular plant species recorded from swamp forest in Singapore. It is compiled from the list given by Corner (1978) for his plots at Jurong and Mandai Road, specimens in the herbarium of the Singapore Botanic Gardens (SING) where Nee Soon or Chan Chu Kang are given as collecting localities, recent collections from the Nature Reserves mostly as outlined by Turner *et al.* (1994) and the results of the forest survey of Wong *et al.* (1994). Clearly, the flora of the swamp forest is rich, with more than 700 species having been recorded from this vegetation type in Singapore.

Vegetation Structure and Physiognomy

The forest at Nee Soon has an appearance similar to that outlined for freshwater swamp forest in other localities by Corner (1978). The ground is saturated with frequent small streams and pools of water. Many of the trees exhibit the prolific development of large stilt roots and/or abundant pneumatophores of various descriptions, that Corner illustrates profusely in his book. In apparently primary areas, the trees can reach large size, with heights of 40 m or more being recorded (Hill 1977).

During a survey of the forest communities of the Central Catchment Nature Reserve (Wong *et al.* 1994) three 0.2 ha plots were enumerated in the swamp forest. The location of plots 26, 27 and 28 are given in Figure 1. The floristic composition for trees of greater than 30 cm girth at breast height (1.3 m) in the three plots is given in Table 1. The composition of the three plots was different from the plots surveyed in the primary forest on dryland sites (Turner *et al.* 1996b). Important species in terms of basal area were *Pometia pinnata*, *Palaquium xanthochyllum*, *Mangifera griffithii*, *Gluta wallichii* and *Strombosia ceylanica*. Corner (1978) reported these to be abundant in his Mandai Road plots, indicating a strong similarity in the forest between the two sites, which is not surprising given their propinquity.

Table 1

Composition of the forest community (> 30 cm gbh) in three 0.2 ha plots in the Nee Soon swamp forest. *n* = number of individuals of each species, *ba* = total basal area (cm²). Species are in descending order of total basal area summed for the three plots. Some individuals could not be identified and are referred to by code numbers.

species	plot					
	26		27		28	
	<i>n</i>	<i>ba</i>	<i>n</i>	<i>ba</i>	<i>n</i>	<i>ba</i>
<i>Pometia pinnata</i>	6	10599	5	10357	2	6531
<i>Palaquium xanthochyllum</i>	5	17983	2	1866	2	7128
<i>Mangifera griffithii</i>	5	8853	7	4649	6	6160
<i>Gluta wallichii</i>	5	6466	3	3082	5	6362
<i>Strombosia ceylanica</i>	10	8104	3	1017	11	5295
Z 19					1	13440
<i>Pentace triptera</i>	3	7322				
Z 03			1	6237		
<i>Palaquium rostratum</i>	2	3107	1	2114		
<i>Santiria rubiginosa</i>	5	4955				
<i>Mussaendopsis beccariana</i>	4	1406	5	1514	4	1912
<i>Gonystylus maingayi</i>					2	4494
<i>Polyalthia glauca</i>	5	1635	6	2521		
<i>Camptosperma auriculatum</i>			1	3677		
<i>Bhesa paniculata</i>	2	1571	1	1559	4	484
<i>Lophopetalum multinervium</i>	1	232	4	2982		
<i>Calophyllum teysmannii</i>					2	3199
U 11			1	3182		
<i>Xanthophyllum ellipticum</i>			2	2750		
<i>Gymnacranthera farquhariana</i>	4	1656	1	447	2	604

	26		plot		27		28	
<i>Vatica ridleyana</i>	3	735					2	1758
<i>Ganua motleyana</i>	3	2060			1	215		
<i>Ochanostachys amentacea</i>					1	2192		
<i>Sandoricum beccarianum</i>							1	2166
<i>Myristica cinnamomea</i>							3	2027
<i>Myristica elliptica</i>	1	72			1	588	2	1353
<i>Xanthophyllum affine</i>	3	758					6	1174
<i>Carallia brachiata</i>	2	1422			1	207	1	199
<i>Macaranga conifera</i>							2	1811
<i>Alstonia angustiloba</i>					1	1790		
<i>Horsfieldia polyspherula</i>	2	558			4	1209		
<i>Triomma malaccensis</i>					2	376	1	1283
<i>Scaphium macropodium</i>					1	1559		
<i>Artocarpus kemando</i>							1	1515
<i>Xylopiya malayana</i>	1	733					2	736
<i>Eugenia cerina</i>	1	1450						
<i>Diospyros maingayi</i>	1	718					2	692
<i>Jackiopsis ornata</i>							1	1386
<i>Lithocarpus bennettii</i>					2	1384		
<i>Sterculia macrophylla</i>					1	1263		
<i>Alseodaphne bancana</i>	1	828					2	382
<i>Sterculia cordata</i>							1	1191
<i>Magnolia candollii</i>	1	241			3	740	2	194
Z 09	1	1146						
<i>Campnosperma squamatum</i>					2	263	3	832
<i>Aquilaria malaccensis</i>	1	1052						
<i>Tristaniaopsis merguensis</i>							1	1016
<i>Archidendron ellipticum</i>					1	998		
<i>Horsfieldia sucosa</i>					2	993		
<i>Aglaia rubiginosa</i>					2	985		
Z 17							2	926
<i>Blumeodendron tokbrai</i>							3	1165
<i>Pellacalyx axillaris</i>					2	409	1	447
<i>Horsfieldia crassifolia</i>							1	796
<i>Xylopiya fusca</i>							1	796
<i>Alangium nobile</i>					1	115	1	616
<i>Xanthophyllum obscurum</i>							1	688
<i>Knema communis</i>	1	509			1	176		
<i>Osmelia philippinensis</i>	3	471			1	127	1	72
<i>Litsea erectinervia</i>					2	320	2	328
<i>Memecylon edule</i>							1	644
<i>Knema curtisii</i>							1	644
<i>Lophopetalum wightianum</i>					1	602	4	2982
<i>Garcinia parvifolia</i>	1	140			2	454		
<i>Kibatalia maingayi</i>	1	575						
<i>Knema conferta</i>					1	535		
<i>Mastixia trichotoma</i>					2	509		
<i>Cryptocarya ferrea</i>					1	97	3	366
MYRISTICACEAE1							1	460
<i>Beilschmiedia kunstleri</i>							1	447
<i>Castanopsis nephelioides</i>							1	436

	26		27 plot		28	
Z 12	1	215			1	215
<i>Knema laurina</i>	1	412				
U 12					1	412
<i>Macaranga triloba</i>	1	72	2	159	1	140
<i>Litsea robusta</i>			2	361		
<i>Myristica lowiana</i>	1	357				
<i>Prunus polystachya</i>	1	347				
<i>Parishia maingayi</i>	1	336				
<i>Dysoxylum densiflorum</i>	1	316				
<i>Shorea platycarpa</i>			1	306		
<i>Baccaurea minor</i>					1	296
<i>Knema hookeriana</i>			1	286		
<i>Calophyllum dispar</i>			1	277		
<i>Kibara coriacea</i>	1	277				
<i>Knema latericia</i>	2	264				
<i>Baccaurea parvifolia</i>			1	258		
<i>Diospyros lanceifolia</i>			1	249		
<i>Phoebe grandis</i>					1	241
<i>Mangifera foetida</i>			1	232		
Z 11	1	232				
<i>Aglaia maingayi</i>			1	223		
<i>Baccaurea racemosa</i>	1	215				
Z 14			1	215		
<i>Gnetum gnemon</i>			1	215		
<i>Garcinia eugeniifolia</i>					1	215
<i>Aglaia odoratissima</i>			1	207		
<i>Pternandra coerulescens</i>			1	207		
<i>Pimelodendron griffithii</i>			1	199		
<i>Garcinia forbesii</i>			1	199		
Z 10	1	191				
Z 18					1	191
<i>Baccaurea hookeri</i>	1	183				
<i>Shorea macroptera</i>			1	183		
<i>Neoscortechinia kingii</i>					1	176
<i>Aporosa penangensis</i>	1	176				
<i>Myristica iners</i>			1	176		
<i>Cyathocalyx ramuliflorus</i>	1	168				
<i>Shorea ovalis</i>			1	154		
<i>Sarcotheca griffithii</i>	1	154				
<i>Diospyros pilosanthera</i>					2	153
<i>Melanochyla caesia</i>	1	72	1	81		
<i>Knema malayana</i>			1	147		
Z 15					1	140
<i>Calophyllum tetrapterum</i>	1	134				
<i>Eugenia papillosa</i>			1	134		
<i>Gynotroches axillaris</i>					1	134
<i>Garcinia nervosa</i>	1	115				
<i>Horsfieldia wallichii</i>					1	109
Z 13			1	103		
<i>Lansium domesticum</i>			1	103		
<i>Pyrenaria acuminata</i>			1	103		

	26		plot 27		28	
<i>Buchanania sessilifolia</i>	1	97				
Z 16					1	97
<i>Elaeocarpus petiolatus</i>			1	92		
<i>Lithocarpus sundaicus</i>			1	92		
<i>Eurya acuminata</i>			1	92		
<i>Sterculia rubiginosa</i>			1	87		
<i>Gymnacranthera bancana</i>			1	87		
<i>Microcos blattifolia</i>			1	81		
<i>Bhesa robusta</i>					1	81
<i>Stemonoporus scorpioides</i>					1	81
<i>Memecylon lilacinum</i>			1	81		
<i>Diplospora malaccensis</i>			1	81		
<i>Dysoxylum excelsum</i>			1	72		
<i>Ardisia colorata</i>	1	72				
<i>Symplocos fasciculatus</i>	1	72				
<i>Xanthophyllum vitellinum</i>	1	72				
TOTAL (ba in m²)	108	9.18	107	6.64	121	8.20

The terrestrial herbs have been surveyed also in these three plots (Turner *et al.* 1996a). Twenty species were recorded (Table 2), with only *Aglaonema nebulosum* and *Labisia pumila* being found in all three plots. The Araceae proved to be particularly diverse.

Table 2

Terrestrial herbaceous species recorded from the three 0.2 ha plots enumerated in Nee Soon swamp forest. + indicates presence.

species	plot 26	plot 27	plot 28
<i>Aglaonema nebulosum</i>	+	+	+
<i>Aglaonema nitidum</i>	+	+	
<i>Alocasia denudata</i>			+
<i>Amischotolype gracilis</i>		+	+
<i>Cryptocoryne griffithii</i>		+	+
<i>Cyrtosperma merkusii</i>		+	
<i>Homalomena</i> sp. 1		+	
<i>Homalomena</i> sp. 2		+	
<i>Labisia pumila</i>	+	+	+
<i>Lecanorchis malaccensis</i>		+	
<i>Leptaspis urceolata</i>		+	
<i>Lindsaea doryophora</i>		+	
<i>Mapania cuspidata</i>	+		
<i>Mapania squamata</i>		+	
<i>Ophiorrhiza singaporensis</i>			+
<i>Peliosanthes tetra</i> ssp. <i>humilis</i>		+	
<i>Plocoglottis javanica</i>		+	
<i>Schismatoglottis wallichii</i>	+		
<i>Syngramma alismifolia</i>	+		+
<i>Trichomanes obscurum</i>			+
Total number of species	6	12	10

Soil

The soil in freshwater swamp forest is generally rich in organic matter, presumably because the anaerobic nature of the waterlogged conditions reduces the rate of decomposition. However, this process has not proceeded far enough to develop soils of high enough organic matter content to be considered peats (generally >90% loss-on-ignition by mass). Some preliminary analyses for soil samples from Nee Soon (Table 3) showed the soil surface to have high loss-on-ignition, averaging nearly 80% and approaching 90% in places, though the values dropped rapidly below 5 cm depth to generally less than 50% loss-on-ignition. Some pH measurements showed that stream water and soil water lay in the range 4.6-5.5, with soil pH at 5 cm depth to be lower, 4.0-4.5. The concentrations of the major plant nutrients, nitrogen, phosphorus and potassium, were measured in the litter, soil and some foliar samples (shade leaves) gathered at Nee Soon (Table 4 and 5). Surprisingly, the litter generally had lower concentrations of the important elements than the top 5 cm layer of the soil. Possibly this represents the flushing of nutrients down through the soil.

The nutrient concentration data can be compared with values obtained for the coastal hill dipterocarp forest at Bukit Timah (Grubb *et al.* 1994). The comparison of the soil values between the two sites is difficult given the very different soil bulk densities because of the high organic matter content of the soils at Nee Soon. Bukit Timah has more acidic soil (3.7-4.0 versus 4.0-4.5) and slightly higher litter concentrations of N (12.9-14.5 versus 9.4 mg g⁻¹), lower concentrations of P (0.21-0.23 versus 0.47 mg g⁻¹) and higher concentrations of K (2.0-5.9 versus 0.48 mg g⁻¹). The foliage samples show a similar pattern with higher mean P in the leaves at Nee Soon (1.72 versus 0.68 mg g⁻¹), but lower N (13.2 versus 17.1 mg g⁻¹) and K (8.3 versus 10.5 mg g⁻¹) concentrations. It would appear that Nee Soon probably has more phosphorus available for plant growth than Bukit Timah, but possibly slightly less nitrogen and potassium. Phosphorus appears to be the nutrient limiting the growth of non-mycorrhizal plants on Bukit Timah soil (Burslem *et al.* 1994), though mycorrhizal plants seem not to be responsive to P fertilization (Burslem *et al.* 1995). Nee Soon may, therefore, present a potentially more fertile site for plant growth, but of course the water-logged conditions are highly unfavourable to many species. This relatively high nutrient availability may be what prevents peat formation from occurring.

Table 3

Analyses of soil and leaf litter from Nee Soon Swamp Forest, Singapore.

	loss-on-ignition (%)	total N (mg g ⁻¹)	total P (mg g ⁻¹)	total K (mg g ⁻¹)
leaf litter				
sample 1	-	9.88	0.52	0.52
sample 2	-	8.50	0.42	0.48
sample 3	-	9.83	0.49	0.43
mean	-	9.40	0.47	0.48
soil (0-5 cm)				
sample 1	88.7	22.2	0.87	0.51
sample 2	60.8	12.8	0.70	0.52
sample 3	89.6	17.5	0.87	0.64
mean	79.7	17.5	0.81	0.56
soil (5-10 cm)				
sample 1	54.8	9.53	0.84	0.72
sample 2	34.8	6.25	0.45	0.69
sample 3	47.5	7.41	0.54	1.16
mean	45.7	7.73	0.61	0.86

Table 4

Foliar analyses for shade leaves from trees at Nee Soon Swamp Forest, Singapore.

species	total N (mg g ⁻¹)	total P (mg g ⁻¹)	total K (mg g ⁻¹)
<i>Archidendron</i> sp.	18.9	1.28	8.9
<i>Calophyllum</i> sp.	7.7	0.55	5.7
<i>Desmos dasymaschala</i>	16.2	2.86	11.0
<i>Diospyros</i> sp.	10.6	1.88	7.5
<i>Litsea ridleii</i>	9.7	2.41	12.3
<i>Nephelium</i> sp.	14.2	1.95	7.1
<i>Pternandra echinata</i>	12.4	1.22	5.8
<i>Strombosia ceylanica</i>	14.3	1.16	8.3
sp. indet.	14.8	2.17	7.9
mean	13.2	1.72	8.3

Conservation

Nee Soon is now Singapore's last fragment of freshwater swamp remaining. Many species of plants and animals are now restricted to this area, hence making Nee Soon of great importance in terms of the biodiversity of Singapore. The plant list includes *Aeschynanthus wallichii*, *Bulbophyllum macranthum*, *Cystorchis variegata*, *Kopsia singaporensis*, *Luvunga crassifolia*, *Neoscortechinia kingii* and *Xylopius fusca*. Ng and Lim (1992) list many animal species restricted, in Singapore, to Nee Soon. Species found at Nee Soon are generally not found at Bukit Timah, and vice versa, so the two are the twin pillars of biodiversity in Singapore and require strict protection.

Acknowledgements

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APPENDIX 1

SPECIES LIST OF VASCULAR PLANTS FOR FRESHWATER SWAMP FOREST IN SINGAPORE

Species marked with an asterisk are those recorded by Corner (1978) from freshwater swamp forest in Singapore. Where taxonomic revisions have necessitated name changes, or specimens were misidentified, the name used by Corner is given in parentheses. Other species are those collected recently or known from herbarium specimens where Nee Soon swamp forest or Chan Chu Kang are given as the collecting locality. For more information regarding NRS series collections see Turner *et al.* (1994). Species recorded from the three 0.2 ha plots at Nee Soon (Wong *et al.* 1994) are marked with a dagger (†). Only forest species are included. The determination of *Mangifera* species follows Kostermans & Bompard (1993).

LYCOPODOPHYTA

Lycopodiaceae

- Huperzia nummulariifolia* (Blume) Jermy - Ridley s.n. (Oct 1889)
- * *Huperzia phlegmaria* (L.) Rothm. (*Lycopodium phlegmaria*) - Ridley 2420 (1884)
- * *Huperzia squarrosa* (G. Forst.) Trevisan (*Lycopodium squarrosus*)

Selaginellaceae

- Selaginella argentea* (Wall.) Spr. - NRS1972

FILICINOPHYTA

Adiantaceae

- † *Syngamma alismifolia* (C. Presl) J. Sm. - NRS1610
- * *Taenitis blechnoides* (Willd.) Sw.

Aspleniaceae

- Asplenium batuense* Alderw. - NRS1185
- Asplenium macrophyllum* Sw. - Goodenough s.n. (1890)
- * *Asplenium nidus* L.
- * *Asplenium nitidum* Sw. (*Asplenium glaucophyllum*)

Blechnaceae

- Blechnum finlaysonianum* Hook. & Grev. - Ridley 6121 (1894)
- * *Blechnum orientale* L.
- * *Stenochlaena palustris* (Burm.) Bedd. - NRS1589

Cyatheaceae

- * *Cyathea glabra* (Blume) Copel. - NRS1526
- * *Cyathea latebrosa* (Wall. ex Hook.) Copel. - NRS1508

Davalliaceae

- Davallia angustata* Wall. ex Hook. & Grev. - Ridley 3599a (189?)

Dennstaedtiaceae

- * *Histiopteris incisa* (Thunb.) J.Sm.

Lindsaea doryophora Kramer - NRS1519

- * *Lindsaea parasitica* (Roxb. ex Griff.) Hieron. (*L. scandens*) - NRS0158

Dryopteridaceae

Tectaria barberi (Hook.) Copel. - Maxwell 82-71 (18 Mar 1982)

Tectaria singaporeana (Wall. ex Hook. & Grev.) Copel.

Hymenophyllaceae

Trichomanes christii Copel. - NRS0867

- * *Trichomanes motleyi* (Bosch) Bosch

- *† *Trichomanes obscurum* Blume - Ridley 6119 (1894)

Lomariopsidaceae

Teratophyllum aculeatum (Blume) Mett. ex Kuhn - NRS0051

- * *Teratophyllum ludens* (Fée) Holttum - NRS0132

Polypodiaceae

- * *Drynaria quercifolia* (L.) Sm.

Lecanopteris sinuosa (Wall. ex Hook.) Copel. - NRS0157

Microsorium punctatum (L.) Copel. - Ridley s.n. 1896

- * *Platyserium coronarium* (D. Koenig ex O.F. Müll.) Desv. - NRS1603

- * *Pyrrosia angustata* (Sw.) Ching

Pyrrosia longifolia (Burm.) Morton - NRS0131

Schizaeaceae

Lygodium longifolium (Willd.) Sw. - Ridley 4229 (Dec 1892)

Schizaea digitata (L.) Sw. - NRS0171

Thelypteridaceae

Christella parasitica (L.) Lév. - NRS0145

- * *Mesophlebion chlamydophorum* (Rosenst. ex C. Chr.) Holttum (*Thelypteris chlamydophora*)

Sphaerostephanos heterocarpus (Blume) Holttum - Ridley 6120 (1894)

Vittariaceae

- * *Vittaria ensiformis* Sw.

Woodsiaceae

Diplazium crennatoserratum (Blume) Moore - Ridley 4399 (1892)

GNETOPHYTA

Gnetaceae

- † *Gnetum gnemon* L.

- * *Gnetum gnemonoides* Brongn. - NRS0781

Gnetum macrostachyum Hook.f. - NRS0196

- * *Gnetum microcarpum* Blume - Maxwell 82-198 (29 Jul 1982)

CONIFEROPHYTA**Podocarpaceae**

- * *Nageia wallichiana* (Presl) Kuntze

ANGIOSPERMOPHYTA**Acanthaceae**

- Hygrophila ringens* (L.) R.Br. ex Steud. - NRS2438
- Justicia vasculosa* Wall. - NRS1388
- Staurogyne setigera* Kuntze - NRS0166

Alangiaceae

- * *Alangium ebenaceum* (C.B. Clarke) Harms var. *tutela* (Ridl.) Kochummen
- † *Alangium nobile* (C.B. Clarke) Harms

Anacardiaceae

- † *Buchanania sessifolia* Blume
- *† *Campnosperma auriculatum* (Blume) Hook.f.
- *† *Campnosperma squamatum* Ridl. - NRS101
- *† *Gluta wallichii* (Hook.f.) Ding Hou (*Melanorrhoea wallichii*) - Hullett 601 (8 Feb 1887)
- † *Mangifera foetida* Lour.
- † *Mangifera griffithii* Hook.f.
- * *Mangifera magnifica* Kochummen (*Mangifera quadrifida*)
- * *Mangifera paludosa* Kosterm. (*Mangifera* aff. *parvifolia*)
- * *Melanochyla auriculata* Hook.f. - Ridley 3975 (1892)
- *† *Melanochyla caesia* (Blume) Ding Hou (*Melanochyla kunstleri*)
- † *Parishia maingayi* Hook.f.

Ancistrocladaceae

- Ancistrocladus tectorius* (Lour.) Merr. - NRS1523

Anisophylleaceae

- * *Anisophyllea disticha* (Jack) Baill. - Maxwell 82-101 (7 Apr 1982)

Annonaceae

- Artabotrys costatus* King - NRS1358
- Artabotrys suaveolens* (Blume) Blume - Maxwell 82-70 (18 Mar 1982)
- *† *Cyathocalyx ramuliflorus* (Maingay ex Hook.f. & Thomson) Scheff.
- * *Cyathostemma viridiflorum* Griff. - Maxwell 80-211 (28 Nov 1980)
- † *Desmos dasymaschala* (Blume) Saff.
- * *Desmos dumosus* (Roxb.) Saff. - Maxwell 81-57 (1 Apr 1980)
- * *Friesodielsia biglandulosa* (Blume) Steenis (*Oxymitra biglandulosa*) - Sinclair SFN40271 (1 May 1954)
- * *Friesodielsia borneensis* (Miq.) Steenis (*Oxymitra borneensis*)
- * *Friesodielsia glauca* (Hook.f. & Thomson) Steenis (*Oxymitra glauca*)
- Friesodielsia latifolia* (Hook.f. & Thomson) Steenis - Goodenough s.n. (189?)
- Goniothalamus macrophyllus* (Blume) Hook.f. & Thomson - NRS1171
- * *Goniothalamus ridleyi* King - NRS0160

- * *Mezzettia parviflora* Becc. (*Mezzettia leptopoda*)
- * *Mitrella kentii* (Blume) Miq. - NRS0119
- * *Polyalthia angustissima* Ridl.
- *† *Polyalthia glauca* (Hassk.) Muell.
- * *Polyalthia hypoleuca* Hook.f. & Thomson
- * *Polyalthia lateriflora* (Blume) King
- * *Polyalthia sclerophylla* Hook.f. & Thomson
- * *Popowia tomentosa* Maingay ex Hook.f. & Thomson (*Popowia hirta*)
- * *Pyramidanthe prismatica* (Hook.f. & Thomson) Merr.
- Uvaria cordata* (Dunal) Alston - NRS0120
- * *Uvaria leptopoda* (king) R.E. Fries
- * *Xylopi caudata* Hook.f. & Thomson
- *† *Xylopi fusca* Maingay ex Hook.f. & Thomson
- *† *Xylopi malayana* Hook.f. & Thomson - DJM100

Apocynaceae

- * *Alstonia angustifolia* Wall. ex A.DC.
- † *Alstonia angustiloba* Miq.
- * *Alstonia spatulata* Blume
- * *Anodendron candolleanum* Wight
- † *Kibatalia maingayi* (Hook.f.) Woodson
- * *Kopsia singapurensis* Ridl. - NRS0126
- Leuconotis griffithii* Hook.f. - Ridley s.n. (1894)
- Leuconotis maingayi* Dyer ex Hook.f. - NRS0169
- * *Parameria polyneura* Hook.f.
- Parsonsia stenocarpa* King & Gamble - Maxwell 80-208 (28 Nov 1980)
- * *Tabernaemontana corymbosa* Roxb.
- * *Urceola torulosa* Hook.f.
- * *Urularia flavescens* (Dyer ex Hook.f.) Stapf
- * *Willughbeia coriacea* Wall. - NRS0048

Aquifoliaceae

- * *Ilex cymosa* Blume - Ridley s.n. (23 Sep 1890)
- * *Ilex macrophylla* Hook.f.

Araceae

- † *Aglaonema nebulosum* N.E.Br. - NRS0161
- *† *Aglaonema nitidum* (Jack) Kunth - NRS0766
- Aglaonema simplex* Blume - NRS0868
- *† *Alocasia denudata* Engl. - Ridley s.n. (30 Oct 1889)
- * *Anadendrum montanum* (Blume) Schott - NRS2418
- † *Cryptocoryne griffithii* Schott - NRS1525
- † *Cyrtosperma merkusii* (Hassk.) Schott - NRS0889
- Homalomena griffithii* (Schott) Hook.f. - Ridley s.n. (May 1889)
- * *Homalomena sagittifolia* Jungh. ex Schott - NRS2419
- * *Pothos latifolius* Hook.f.
- Rhaphidophora korthalsii* Schott - NRS1591
- Rhaphidophora sylvestris* (Blume) Engl. var. *montana* (Blume) Nicols. - NRS0992
- Schismatoglottis wallichii* (Roxb.) Hook.f. - NRS1604
- Scindapsus hederaceus* (Zoll. & Moritzi) Miq. - NRS1509

Araliaceae

- * *Arthrophyllum diversifolium* Blume (*Arthrophyllum ovalifolium*)
- * *Schefflera cephalotes* (C.B. Clarke) Harms

Asclepiadaceae

- * *Dischidia albiflora* Griff. (*Dischidia collyris*)
- * *Dischidia complex* Griff.
- * *Dischidia hirsuta* (Blume) Decne.
- * *Dischidia major* (Vahl) Merr. (*Dischidia rafflesiana*)
- * *Dischidia nummularia* R.Br.
- * *Toxocarpus griffithii* Decne. (*Toxocarpus glabrescens*)

Bignoniaceae

- * *Deplanchea bancana* (Scheff.) Steenis

Bombacaceae

- * *Coelostegia griffithii* Benth.
- * *Durio singaporensis* Ridl.
- * *Neesia malayana* Bakh. - Ridley 3770 (1892)
- Neesia synandra* Mast. - NRS0996

Burseraceae

- Canarium littorale* Blume - Ridley 44 (Nov 1889)
- * *Canarium odontophyllum* Miq. - Corner's specimen (s.n. 25 Apr 1934) taken from a 12 foot sapling is the only record of this species from the Malay Peninsula.
- * *Canarium pilosum* Benn.
- * *Dacryodes incrvata* (Engl.) H.J. Lam
- * *Dacryodes rostrata* (Blume) Lam
- * *Santiria apiculata* Benn.
- * *Santiria griffithii* (Hook.f.) Engl.
- * *Santiria laevigata* Blume
- *† *Santiria rubiginosa* Blume
- † *Triomma malaccensis* Hook.f.

Caprifoliaceae

- Viburnum sambucinum* Blume - Ridley 6829

Cecropiaceae

- Poikilospermum suaveolens* (Blume) Merr. - NRS1020 CCA 18

Celastraceae

- *† *Bhesa paniculata* Arn. - NRS0170
- † *Bhesa robusta* (Roxb.) Ding Hou
- * *Euonymus javanicus* Blume
- *† *Lophopetalum multinervium* Ridl.
- † *Lophopetalum wightianum* Arn.
- Salacia grandiflora* Kurz - NRS0128

Chrysobalanaceae

Auna racemosa Rafin. - Ridley 1898 (7 Dec 1890)

Liania splendens (Korth.) Prance - Ridley 4732 (15 Feb 1893)

* *Parastemon urophyllus* (Wall. ex A. DC.) A. DC.

* *Parinari costata* (Korth.) Blume

* *Parinari oblongifolia* Hook.f.

Combretaceae

Combretum sundaicum Miq. - Mat 6783 (1985)

Quisqualis indica L. - Ridley 8053 (1896)

* *Terminalia phellocarpa* King

Commelinaceae

† *Amischotolype gracilis* (Ridl.) I.M. Turner - NRS0179

Compositae

Vernonia arborea Buch.-Ham. - Goodenough 2739 (1891)

Connaraceae

* *Agelaea borneensis* (Hook.f.) Merr. - Maxwell 82-107 (28 May 1981)

* *Cnestis palala* (Lour.) Merr.

Connarus ferrugineus Jack - Maxwell 83-26 (13 Mar 1983)

Connarus grandis Jack - J. Sinclair SFN40321 (3 Jul 1954)

* *Connarus monocarpus* L. ssp. *malayanus* Leenhouts

* *Connarus semidecandrus* Jack

Rourea fulgens Planch. - NRS0860

* *Rourea minor* (Gaertn.) Leenhouts

Convallariaceae

† *Peliosanthes tetra* Andr. ssp. *humilis* (Andr.) Jessp. - NRS1169

Convolvulaceae

* *Argyreia ridleyi* Prain ex Ooststr. - NRS0001 CCA 13

* *Erycibe griffithii* C.B. Clarke

Erycibe tomentosa Blume var. *tomentosa* - NRS0181

Cornaceae

† *Mastixia trichotoma* Blume - Maxwell 82-258 (23 Jun 1982)

Cucurbitaceae

Trichosanthes celebica Cogn. - Maxwell 80-176 (31 July 1980)

Cyperaceae

Hypolytrum nemorum (Vahl) Spreng. - NRS1176

† *Mapania cuspidata* (Miq.) Uittien - NRS1620

* *Mapania enodis* (Miq.) C.B. Clarke

* *Mapania lorea* Uittien

† *Mapania squamata* (Kurz) C.B. Clarke - NRS1505

* *Thoracostachyum bancanum* (Miq.) Kurz

Dilleniaceae

- * *Acrotrema costata* Jack - no herbarium material of this species collected in Singapore can be found.
- * *Dillenia grandifolia* Wall. ex Hook.f & Thomson
- * *Dillenia pulchella* (Jack) Gilg
- * *Tetracera akara* (Burm.f.) Merr.
- * *Tetracera arborescens* Jack
- Tetracera indica* (Christm. & Panz.) Merr. - NRS0184

Dioscoreaceae

- Dioscorea laurifolia* Wall. ex Hook.f. - NRS0042
- Dioscorea polyclades* Hook.f. - Mat s.n. (15 May ?)

Dipterocarpaceae

- * *Hopea mengerawan* Miq. - Goodenough 5094 (8 Apr 1893)
- * *Shorea gratissima* Dyer
- *† *Shorea macroptera* Dyer
- † *Shorea ovalis* Blume (*S. ?eximia*)
- *† *Shorea platycarpa* Heim
- * *Vatica pauciflora* Blume (*Vatica wallichii*) - Hill & Samsuri H3001 (22 Oct 1971)
- + *Vatica ridleyana* Brandis

Dracaenaceae

- Dracaena aurantiaca* Wall. - NRS0139
- Dracaena elliptica* Thunb. - Ridley s.n. (1894)
- Dracaena singapurensis* Ridl. - Ridley 6235 (1894)
- Dracaena umbratica* Ridl. - NRS1167

Ebenaceae

- * *Diospyros coriacea* Hiern
- *† *Diospyros lanceifolia* Roxb. - Ridley 6695 (1894)
- *† *Diospyros maingayi* (Hiern) Bakh.
- *† *Diospyros pilosanthera* Blanco var. *oblonga* (Wall. ex G. Don) Ng (*Diospyros oblonga*) - Hill & Samsuri H3025 (22 Oct 1971)
- * *Diospyros siamang* Bakh.
- Diospyros sumatrana* Miq. - Maxwell 82-73 (18 Mar 1982)

Elaeocarpaceae

- Elaeocarpus acmosepalus* Ridl. - Maxwell 83-25 (13 Mar 1983)
- Elaeocarpus ferrugineus* (Jack) Steud. - Goodenough 4948 (24 Feb 1890)
- Elaeocarpus floribundus* Blume - Sidek 605 (18 Mar 1982)
- * *Elaeocarpus griffithii* (Wight) A. Gray - Ridley 418 (Nov 1889)
- * *Elaeocarpus mastersii* King - Ridley 274 (Nov 1889)
- Elaeocarpus nitidus* Jack var. *salicifolius* (King) Ng - Samsuri Ahmad 1522 (17 Sept 1981)
- † *Elaeocarpus petiolatus* (Jack) Wall.
- * *Elaeocarpus polystachyus* Wall. - Maxwell 81-214 (24 Sept 1981)
- Elaeocarpus stipularis* Blume - Maxwell 82-69 (18 Mar 1982)

Euphorbiaceae

- * *Agrostistachys longifolia* (Wight) Benth. ex Hook.f. (*Agrostistachys sessilifolia*) - NRS018

- * *Alchornea villosa* Müll.Arg.
- Antidesma coriaceum* Tul. - Maxwell 81-60 (1 Apr 1981)
- Antidesma cuspidatum* Müll.Arg. - NRS0856
- Antidesma neurocarpum* Miq. - NRS0116
- Aporosa confusa* Gage - NRS1359
- Aporosa frutescens* Blume - NRS0193
- † *Aporosa penangensis* (Ridl.) Airy Shaw
- Aporosa symplocoides* (Hook.f.) Gage - NRS0876
- * *Austrobuxus nitidus* Miq.
- † *Baccaurea hookeri* Gage
- * *Baccaurea kunstleri* King ex Gage
- † *Baccaurea minor* Hook.f.
- † *Baccaurea parviflora* (Müll.Arg.) Müll.Arg.
- † *Baccaurea racemosa* (Reinw.) Müll.Arg.
- *† *Blumeodendron tokbrai* (Blume) Kurz
- * *Bridelia griffithii* Hook.f.
- * *Croton laevifolius* Blume - NRS0872
- * *Drypetes pendula* Ridl.
- * *Endospermum diadenum* (Miq.) Airy Shaw
- * *Glochidion hypoleucum* (Miq.) Boerl. - Maxwell 82-181 (1 Jul 1982)
- * *Glochidion rubrum* Blume
- * *Glochidion sericeum* (Blume) Zoll. & Moritzi - Maxwell 82-53 (26 Feb 1982)
- Glochidion superbum* Baill. - NRS0007
- * *Hymenocardia* sp. [the correct identity of this species has still not been determined]
- *† *Macaranga conifera* (Zoll.) Müll.Arg.
- * *Macaranga gigantea* (Rchb. f. & Zoll.) Müll.Arg.
- * *Macaranga griffithiana* Müll.Arg.
- * *Macaranga hypoleuca* (Rchb.f. & Zoll.) Müll.Arg.
- * *Macaranga puncticulata* Gage
- * *Macaranga recurvata* Gage
- * *Macaranga trichocarpa* (Rchb.f. & Zoll.) Müll.Arg. - Maxwell 81-81 (29 Apr 1981)
- *† *Macaranga triloba* (Reinw.) Müll.Arg. - NRS0037
- † *Neoscortechinia kingii* (Hook.f.) Pax & K. Hoffm. - NRS0771
- *† *Pimelodendron griffithianum* (Müll.Arg.) Benth.
- * *Sapium discolor* (Champ. ex Benth.) Müll.Arg.

Fagaceae

- * *Castanopsis inermis* (Linfl. ex Wall.) Benth. & Hook.f.
- † *Castanopsis nephelioides* King ex Hook.f.
- Castanopsis wallichii* King ex Hook.f. - Ridley 3842 (Jun 1892)
- *† *Lithocarpus bennettii* (Miq.) Rehder - E. Tang & Sidek 265 (12 Jan 1995)
- * *Lithocarpus elegans* (Blume) Hatus. ex Soepadmo
- † *Lithocarpus sundaicus* (Blume) Rehder

Flacourtiaceae

- Casearia capitellata* Blume - Ridley s.n. (1892)
- * *Casearia lobbiana* Turcz. - Ridley s.n. (1894)
- * *Casearia* sp. - the specimen cited by Corner (SFN32517) is *Campnosperma squamatum*, presumably the wrong number was referred to.
- * *Flacourtia rukam* Zoll. & Moritzi - NRS1015

- * *Osmelia maingayi* King
- † *Osmelia philippina* (Turcz.) Benth. - Maxwell 83-18 (17 Feb 1983)

Flagellariaceae

- * *Flagellaria indica* L. - NRS0015

Gesneriaceae

- Aeschynanthus albidus* (Blume) Steud. (= *A. purpurascens* Hassk.) - NRS1012
- * *Aeschynanthus parvifolius* R.Br.
- * *Aeschynanthus wallichii* R.Br.

Gonystylaceae

- * *Gonystylus confusus* Airy Shaw
- † *Gonystylus maingayi* Hook.f.

Gramineae

- * *Leptaspis urceolata* (Roxb.) R.Br. - NRS0039
- Lophatherum gracile* Brongn. - Goodenough 1701 (8 Feb 1890)

Guttiferae

- † *Calophyllum dispar* P.F. Stevens
- * *Calophyllum ferrugineum* Ridl. (*Calophyllum retusum*)
- * *Calophyllum rubiginosum* M.R. Hend. & Wyatt-Smith. (*C. wallichianum*)
- *† *Calophyllum tetrapterum* Miq. (*Calophyllum floribundum*)
- *† *Calophyllum teysmannii* Miq. (*Calophyllum inophylloide* var. *singaporense*)
- * *Calophyllum wallichianum* Planch. & Triana var. *incrassatum* (M.R. Hend. & Wyatt-Smith.) P.F. Stevens (*Calophyllum incrassatum*)
- * *Cratoxylum arborescens* (Vahl) Blume
- * *Cratoxylum cochinchinense* (Lour.) Blume (*Cratoxylum ligustrinum*) - NRS0172
- * *Cratoxylum formosum* (Jack) Dyer
- † *Garcinia eugeniifolia* Wall. ex T. Anderson - Ridley s.n. (1893)
- *† *Garcinia forbesii* King - NRS0887
- Garcinia griffithii* T. Anderson - DJM101
- ? *Garcinia hombroniana* Pierre - Ridley s.n. (1893)
- Garcinia mangostana* L. - Ridley s.n. (1892)
- † *Garcinia nervosa* Miq. - J. Sinclair SFN10915 (6 Sep 1966)
- * *Garcinia nigrolineata* Planch. ex T. Anderson
- *† *Garcinia parvifolia* (Miq.) Miq. - Ridley s.n. (Nov 1909)
- * *Garcinia scortechinii* King (*Garcinia gaudichaudii*)

Hanguanaceae

- * *Hanguana malayana* (Jack) Merr. - NRS0035

Hypoxidaceae

- Curculigo latifolia* Dryand. - NRS0025 CCA 13

Icacinaeae

- * *Cantleya corniculata* (Becc.) Howard
- Gomphandra quadrifida* (Blume) Sleumer var. *ovalifolia* (Ridl.) Sleumer - NRS0777
- Iodes cirrhosa* Turcz. - NRS0026

Iodes ovalis Blume - NRS0004

* *Phytocrene bracteata* Wall.

* *Phytocrene latifolia* Blume

*† *Stemonurus scorpioides* Becc. - Ridley s.n. (1892)

Irvingiaceae

* *Irvingia malayana* Oliv.

Ixonanthaceae

Ixonanthes icosandra Jack - Ridley 1937 (1890)

Ixonanthes reticulata Jack - NRS0783

Lauraceae

* *Actinodaphne macrophylla* (Blume) Nees

† *Alseodaphne bancana* Miq. - Samsuri 1401 (9 Feb 1977)

*† *Beilschmiedia kunstleri* Gamble

† *Cryptocarya ferrea* Blume - NRS1005

* *Cryptocarya griffithiana* Wight

* *Endiandra maingayi* Hook.f. (*Hexapora ? curtisii*)

* *Lindera lucida* (Blume) Boerl. (*Lindera malaccensis*) - Sinclair SFN40520 (22 Dec 1954)

Litsea elliptica Blume - Samsuri 1446 (9 Feb 1977)

† *Litsea erectinervia* Kosterm.

* *Litsea ferruginea* Blume

* *Litsea firma* Hook.f.

* *Litsea gracilipes* Hook.f. - Sinclair SFN40274 (1 May 1954)

* *Litsea grandis* Hook.f. - Ridley 3962 (1892)

Litsea lancifolia (Roxb.) Hook.f. - Maxwell 82-78 (19 Mar 1982)

Litsea ridleyi Gamble - NRS1183

† *Litsea robusta* Blume

† *Phoebe grandis* Merr.

Leeaceae

Leea indica (Burm.f.) Merr. - NRS0046

Leguminosae

* *Albizia splendens* Miq. (*Pithecellobium confertum*)

Archidendron clypearia (Jack) I.C. Nielsen - NRS0421

*† *Archidendron ellipticum* (Blume) I.C. Nielsen (*Pithecellobium ellipticum*) - Maxwell 81-146 (18 Jun 1981)

Archidendron microcarpum (Benth.) I.C. Nielsen - Samsuri Ahmad 1399 (9 Feb 1977)

Bauhinia semibifida Roxb. - NRS0990

* *Crudia caudata* Prain [we have not been able to trace the specimen referred to by Corner]

* *Dalbergia havilandii* Prain

Dalbergia pseudosissoo Miq. - J. Sinclair SFN39999 (2 Aug 1953)

Derris amoena Benth. var. *maingayana* (Baker) Prain - NRS0118 CCA 18

Derris trifoliata Lour. - Goodenough s.n. (30 Oct 1889)

* *Dialium patens* Baker

Entada spiralis Ridl. - Samsuri Ahmad 1451 (8 Mar 1977)

* *Koompassia malaccensis* Maingay ex Benth.

* *Kunstleria ridleyi* Prain

- * *Millettia eriantha* Benth. (*Adinobotrys eriantha*)
- * *Ormosia macrodisca* Baker
- * *Parkia speciosa* Hassk. - Ridley 419 (Nov 1889)
- Saraca thaipingensis* Cantley - NRS0779
- * *Sindora wallichii* Grah. ex Benth.
- Spatholobus ridleyi* Prain ex King - Mat 6795 (1894)

Linaceae

- * *Indorouchera griffithiana* (Planch.) Hallier f. - NRS0155

Loganiaceae

- * *Fagraea auriculata* Jack
- * *Fagraea racemosa* Jack ex Wall. - NRS1027

Loranthaceae

- Macrosolen cochinchinensis* (Lour.) Tiegh. - Maxwell 82-257 (23 Sept 1982)

Magnoliaceae

- *† *Magnolia candollii* (Blume) H. Keng var. *singaporensis* (Ridl.) Nooteboom (*Talauma singaporensis*, *T. lanuginosa*) - Maxwell 81-145 (18 Jun 1981)

Malpighiaceae

- Aspidopteris concava* (Wall.) Juss. - Maxwell 82-46 (17 Feb 1982)

Melastomataceae

- Clidemia hirta* (L.) D. Don. - NRS0043
- * *Diplectria viminalis* (Jack) Kuntze (*Anplectrum viminale*)
- * *Macrolenes echinulata* (Naud.) Bakh.f. (*Marumia rhodocarpa*)
- * *Medinilla crassifolia* (Reinw. ex Blume) Blume (?*Medinilla rubicunda* var. *hasseltii*) - Ridley 273 (Oct 1889)
- † *Memecylon edule* Roxb.
- * *Memecylon floridum* Ridl. (*Memecylon* sp.)
- † *Memecylon lilacinum* Zoll. & Moritzi
- * *Pachycentria constricta* (Blume) Blume (*Pachycentria tuberculata*)
- *† *Pternandra coerulescens* Jack - NRS0754
- * *Pternandra echinata* Jack - NRS0192
- Sonerila heterostemon* Naud. - NRS0778

Meliaceae

- † *Aglaia odoratissima* Blume - Maxwell 82-282 (4 Nov 1982)
- Aglaia oligophylla* Miq. - Ridley 3919 (1892)
- *† *Aglaia rubiginosa* (Hiern) Pannell - Ridley 3790 (1892)
- * *Aphanamixis polystachya* (Wall.) Parker - Maxwell 82-282 (2 Jul 1981)
- Dysoxylum cauliflorum* Hiern. - Goodenough 5080 (1893)
- Dysoxylum cyrtobotryum* Miq. - Goodenough s.n. (Mar 1890)
- † *Dysoxylum densiflorum* (Blume) Miq.
- † *Dysoxylum excelsum* Blume - Goodenough s.n. (15 Mar 1890)
- Dysoxylum flavescens* Hiern - J. Sinclair SFN40262 (23 Apr 1954)
- † *Lansium domesticum* Correa
- Pseudoclausena chrysogyne* (Miq.) T.P. Clark - Maxwell 81-199 (13 Aug 1981)

*† *Sandoricum beccarianum* Baill. (*Sandoricum emarginatum*)

Menispermaceae

Fibraurea tinctoria Lour. - NRS0143

Limacia scandens Lour. - NRS0147

Stephania capitata (Blume) Spreng. - NRS0159

Tinospora macrocarpa Diels - NRS0849

Monimiaceae

† *Kibara coriacea* (Blume) Tul.

Matthaea sancta Blume - NRS1003

Moraceae

* *Artocarpus elasticus* Reinw. ex Blume - Chew CWL34 (5 Mar 1957)

Artocarpus fulvicortex Jarrett - Ridley 4129 (1892)

*† *Artocarpus kemando* Miq. - Sinclair SFN40322 (3 Jul 1954)

* *Artocarpus nitidus* Tréc. ssp. *griffithii* (King) Jarrett

* *Artocarpus scortechinii* King

* *Ficus albipila* (Miq.) King

* *Ficus apiocarpa* Miq. - NRS2128

* *Ficus binnendykii* Miq. var. *coriacea* Corner

* *Ficus bracteata* Wall. ex Miq.

* *Ficus consociata* Blume var. *murtoni* King - E. Tang & Sidek 785 (10 Jul 1995)

* *Ficus excavata* King

* *Ficus fistulosa* Reinw. ex Blume var. *fistulosa* - NRS0010

* *Ficus globosa* Blume - NRS0183

Ficus heteropleura Blume - NRS1180

* *Ficus microcarpa* L.f.

* *Ficus microsyce* Ridl.

* *Ficus obscura* Blume var. *borneensis* (Miq.) Corner

* *Ficus pellucido-punctata* Griff.

Ficus pisocarpa Blume - DJM318

* *Ficus recurva* Blume var. *ribesioides* King

* *Ficus retusa* L.

* *Ficus ruginervia* L.

* *Ficus sagittata* Vahl -

Ficus scortechinii King - NRS1174

Ficus sinuata Thunb. - NRS0186

* *Ficus sundaica* Blume - NRS0014

* *Ficus trichocarpa* Blume - DJM171

Ficus variegata Blume - Ridley s.n. (189?)

* *Ficus villosa* Blume - NRS1618

Ficus virens Ait. var. *glabella* (Blume) Corner - Ridley 1602 (30 Oct 1889)

* *Ficus xylophylla* Wall. ex Miq.

Parartocarpus bracteatus (King) Becc. - Ridley 4128 (1892)

* *Parartocarpus venenosus* (Zoll. & Moritzi) Becc. ssp. *forbesii* (King) Jarrett

* *Streblus elongatus* (Miq.) Corner

Myristicaceae

* *Endocomia canarioides* (King) W.J. de Wilde (*Horsfieldia macrocoma* var. *canarioides*)

- *† *Gymnacranthera bancana* (Miq.) J. Sinclair
- *† *Gymnacranthera farquhariana* (Hook.f. & Thomson) Warb. (*Gymnacranthera eugeniifolia* var. *griffithii*) - Ridley 1834 (9 Dec 1891)
Gymnacranthera forbesii (King) Warb. - NRS1190
- *† *Horsfieldia crassifolia* (Hook.f. & Thomson) Warb. - Ridley 8040 (Feb 1896)
- * *Horsfieldia grandis* (Hook.f.) Warb.
- *† *Horsfieldia polyspherula* (Hook.f.) J. Sinclair (*Horsfieldia subglobosa*)
- *† *Horsfieldia sucosa* (King) Warb. (*Horsfieldia bracteosa*)
- * *Horsfieldia superba* (Hook.f. & Thomson) Warb.
- † *Horsfieldia wallichii* (Hook.f. & Thomson) Warb. - Ridley 5061 (1893)
- † *Knema communis* J. Sinclair - Ridley 1833
- *† *Knema conferta* (King) Warb.
- *† *Knema curtisii* (King) Warb. var. *paludosa* J. Sinclair
- * *Knema glaucescens* Jack
- † *Knema hookeriana* (Wall. ex Hook.f. & Thomson) Warb.
- * *Knema intermedia* (Blume) Warb.
- † *Knema latericia* Elm. - NRS0869
- † *Knema laurina* (Blume) Warb.
- *† *Knema malayana* Warb. - Maxwell 81-87 (29 Apr 1981)
- *† *Myristica cinnamomea* King - Sinclair SFN40374 (25 Sep 1954)
- *† *Myristica elliptica* Wall. ex Hook. f. & Thomson - NRS0049
- *† *Myristica iners* Blume
- *† *Myristica lowiana* King
Myristica maxima Warb. - Sinclair SFN 40304 (22 May 1954)

Myrsinaceae

- † *Ardisia colorata* Roxb. - NRS0018
Ardisia miqueliana Scheff. - NRS0767
Ardisia sessilis Scheff. - Ridley 3844 (Jun 1892)
Ardisia teysmanniana Scheff. - Maxwell 82-147 (23 Apr 1982)
- * *Ardisia tuberculata* Wall. ex A.DC.
Ardisia villosa Roxb. - NRS0883
Embelia canescens Jack - NRS0947
- * *Embelia coriacea* Wall. ex A. DC.
- * *Embelia fulva* Mez (*E. ?amentacea*)
Labisia pumila (Blume) Fern.-Vill. - NRS1186
- * *Maesa ramentacea* Wall. ex Roxb. - Maxwell 81-240 (3 Dec 1981)

Myrtaceae

- * *Aphanomyrtus rostrata* Miq. (*Pseudoeugenia singaporensis*) - NRS0878
- * *Decaspermum fruticosum* J.R. Forst. & G. Forst - DJM174
- *† *Eugenia cerina* M.R. Hend. - Samsuri Ahmad 1396 (9 Feb 1977)
Eugenia chlorantha Duthie - Ridley 3910
- * *Eugenia cumingiana* Vidal
Eugenia filiformis Duthie var. *clavimyrtus* (Koord. & Valetton) M.R. Hend.
Eugenia grandis Wight - Maxwell 81-103 (28 May 1981)
- * *Eugenia kunstleri* King
Eugenia leptostemon (Korth.) Miq. - Mat s.n. (5 May 1895)
- * *Eugenia longiflora* (Presl) Fern.-Vill.
- * *Eugenia microcalyx* Duthie

- * *Eugenia muelleri* Miq.
- * *Eugenia nemestrina* M.R. Hend. - Corner SFN37396 (28 Dec 1940)
- Eugenia oblongifolia* Duthie - Ridley 360 (Nov 1889)
- * *Eugenia oleina* Wight
- * *Eugenia pachyphylla* Kurz - NRS0138
- *† *Eugenia papillosa* Duthie
- Eugenia polyantha* Wight - NRS0562
- * *Eugenia pseudocrenulata* M.R. Hend.
- Eugenia pseudosubtilis* King - Goodenough 4487 (21 Dec 1889)
- Eugenia pustulata* Duthie - Mat 6806 (15 May 1895)
- Eugenia ridleyi* King - Mat 6805 (15 May 1895)
- * *Eugenia rugosa* (Korth.) Merr.
- * *Eugenia tumida* Duthie - Maxwell 81-210 (24 Sep 1981)
- Rhodamnia cinerea* Jack - Goodenough s.n. (10 Feb 1890)
- † *Tristaniopsis merguensis* (Griff.) Peter G. Wilson & J.T. Waterh.

Najadaceae

- Najas indica* (Willd.) Cham. - NRS0838

Nepenthaceae

- * *Nepenthes ampullaria* Jack
- * *Nepenthes gracilis* Korth.
- * *Nepenthes rafflesiana* Jack

Nymphaeaceae

- * *Barclaya motleyi* Hook.f. - Sinclair SFN40337 (17 July 1954)

Ochnaceae

- * *Brackenridgea hookeri* (Planch.) A. Gray
- Brackenridgea palustris* Bartell. - Ridley 5896 (1894)

Olacaceae

- Erythrophalum scandens* Blume - NRS0845
- † *Ochanostachys amentacea* Mast.
- *† *Strombosia ceylanica* Gardn. - NRS1946

Oleaceae

- * *Chionanthus ramiflorus* Roxb. (*Linociera pauciflora*)
- Jasminum aemulum* R.Br. - Mohd. Shah & Ali MS4153 (3 Dec 1981)

Orchidaceae

- * *Agrostophyllum bicuspidatum* J.J.Sm.
- * *Anoetochilus geniculatus* Ridl. - Ridley 5896 (1894)
- * *Appendicula lucida* Ridl.
- * *Biermannia laciniata* (Carr) Garay (*Chamaeanthus laciniatus*)
- * *Bulbophyllum acuminatum* (Ridl.) Ridl.
- * *Bulbophyllum apodum* Hook.f. - Ridley 3933 (1892)
- Bulbophyllum blumei* (Lindl.) J.J.Sm. - Mat s.n. (1894)
- * *Bulbophyllum botryophorum* Ridl.
- Bulbophyllum gusdorfii* J.J.Sm. - NRS1683

- Bulbophyllum macranthum* Lindl. - NRS1320
Bulbophyllum medusae (Lindl.) Rchb.f. - Goodenough s.n. (1891)
Bulbophyllum ovalifolium (Blume) Lindl. - Mat s.n. (1894)
* *Bulbophyllum pileatum* Lindl.
* *Bulbophyllum pulchellum* Ridl. - Ridley s.n. (19 Dec 1890)
* *Bulbophyllum purpurascens* Teijsm. & Binnend.
* *Bulbophyllum sessile* (Koenig) J.J.Sm. - Ridley s.n. (1892)
* *Bulbophyllum vaginatum* (Lindl.) Rchb.f.
* *Calanthe pulchra* (Blume) Lindl. - Chew & Whitmore s.n. (5 Mar 1957)
* *Ceratostylis subulata* Blume (*Camerotis adnata*)
* *Claderia viridiflora* Hook.f. - NRS0002
Coelogyne mayeriana Rchb.f. - Ridley s.n. (1891)
Corymborkis veratrifolia (Rienw.) Blume - Mat 6756 (1894)
Cymbidium finlaysonianum Lindl. - Ridley s.n. (1891)
Cystorchis variegata Blume - Sinclair SFN40277 (8 May 1954)
* *Dendrobium aloifolium* (Blume) Rchb.f.
* *Dendrobium concinnum* Miq. (*Dendrobium carnosum*) - Ridley s.n. (1892)
* *Dendrobium crumenatum* Sw.
Dendrobium indivisum (Blume) Miq. - Ridley s.n. (1892)
* *Dendrobium leonis* (Lindl.) Rchb.f. - Ridley s.n. (30 Oct 1889)
Dendrobium planibulbe Lindl. - Goodenough s.n. (29 Aug 1890)
* *Dendrobium prostratum* Ridl.
Dendrobium pulchellum Roxb. ex Lindl. - Ridley s.n. (May/Jun 1890)
Dendrobium setifolium Ridl. - Goodenough s.n. (21 Dec 1889)
Dendrobium spegidoglossum Rchb.f. - Ridley s.n. (1894)
* *Dendrobium spurium* (Blume) J.J.Sm.
* *Dendrochilum longifolium* Rchb.f.
Didymoplexis pallens Griff. - Ridley s.n. (1889)
Eria bractescens Lindl. - Ridley s.n. (1890)
* *Eria floribunda* Lindl. - Goodenough s.n. (13 Jan 1892)
* *Eria neglecta* Ridl.
* *Eria nutans* Lindl.
* *Eria pannea* Lindl. - Goodenough s.n. (1891)
Eria pulchella Lindl. - Ridley s.n. (1892)
* *Eulophia spectabilis* (Dennst.) Suresh (*Eulophia squalida*) - Ridley s.n. (1892)
* *Flickingeria comata* (Blume) Hawkes (*Dendrobium comatum*)
* *Flickingeria fimbriata* (Blume) Hawkes (*Dendrobium plicatile*)
* *Galeola nudifolia* Lour. (*Galeola kuhlii*) - Ridley 4037 (28 Oct 1892)
* *Hylophila mollis* Lindl. - Ridley s.n. (Oct 1889)
† *Lecanorchis malaccensis* Ridl. - NRS1533
* *Lipparis gibbosa* Finet - Goodenough s.n. (1891)
Lipparis tricallosa Rchb.f. - Goodenough s.n. (13 Jan 1892)
* *Lipparis wrayi* Hook.f.
Malaxis latifolia J.E.Sm. - Ridley 3922 (1892)
Malaxis micrantha (Hook.f.) Kuntze - Ridley s.n.
Microsaccus javensis Blume - Ridley s.n. (1894)
Nephelaphyllum pulchrum Blume - NRS0775
* *Nervilia punctata* (Blume) Makino
Oberonia stenophylla Ridl. - Corner 393 (Dec 1930)
Plocoglottis gigantea (Hook.f.) J.J.Sm. - NRS0122
*† *Plocoglottis javanica* Blume - NRS0999

Podochilus microphyllus Lindl. - Goodenough s.n. (15 Oct 1889)

Pteroceras pallidum (Ridl.) Holtum - NRS1935

* *Schoenorchis secundiflora* (Ridl.) J.J.Sm.

* *Taeniophyllum filiforme* J.J.Sm.

* *Taeniophyllum obtusum* Blume - NRS1318

* *Thelasis micrantha* (Brongn.) J.J.Sm.

* *Thelasis pygmaea* (Griff.) Lindl. (*Thelasis triptera*)

Thrixspermum trichoglottis (Hook.f.) Kuntze - NRS1319

* *Trichotosia velutina* (Lodd. ex Lindl.) Kraenzl. (*Eria velutina*)

Vrydagzynea lancifolia Ridl. - Ridley s.n. (Jan 1890)

Oxalidaceae

* *Dapania racemosa* Korth.

† *Sarcotheca griffithii* (Planch. ex Hook.f.) Hallier f.

Palmae

Calamus ridleyanus Becc. - Hill & Samsuri 3108 (22 Oct 1971)

* *Cyrtostachys renda* Blume (*Cyrtostachys lakka*)

Daemonorops angustifolia (Griff.) Mart. - NRS0031

Daemonorops didymophylla Becc. - Ridley 3476 (1892)

Daemonorops hystrix (Griff.) Mart. - Ridley s.n.

Daemonorops kunstleri Becc. - Goodenough 1667 (21 Jun 1890)

* *Daemonorops leptopus* (Griff.) Mart.

Daemonorops longipes (Griff.) Mart. - NRS2424

Daemonorops sabut Becc. - Sinclair SFN40303 (22 May 1954)

Eleiodoxa conferta (Griff.) Burret (*Salacca conferta*) - Ridley 3502 (1892)

Iguanura wallichiana (Wall. ex Mart.) Hook.f. - NRS0177

Korthalsia echinometra Becc. - NRS1175

Licuala ferruginea Becc. - NRS1177

Myrialepis paradoxa (Kurz) J. Dransf. - Ridley 3503 (1892)

* *Nenga pumila* (Mart.) Wendl. - Ridley s.n. (1900)

* *Onchosperma horridum* (Griff.) Scheff. - Ridley s.n. (1891)

Orania sylvicola (Griff.) H.E. Moore - Ridley 3144 (1891)

Pinanga malaiana (Mart.) Scheff. - NRS0135

Rhopaloblaste singaporensis (Becc.) Hook.f. - Ridley 2134 (1891)

Pandaceae

* *Galearia fulva* (Tul.) Miq. - NRS0881

Pandanaceae

* *Freycinetia angustifolia* Blume - Samsuri 1451 (8 Mar 1977)

* *Freycinetia confusa* Ridl.

* *Freycinetia corneri* B.C. Stone

* *Frecinetia javanica* Blume - NRS1527

* *Pandanus atrocarpus* Griff.

* *Pandanus kamiae* B.C. Stone

Passifloraceae

Adenia macrophylla (Blume) Koord. var. *singaporeanna* (Wall. ex G. Don) W.J. de Wilde
-NRS1028 CCA 18

Phormiaceae

- * *Dianella ensifolia* (L.) DC. - NRS0281 CCA 18

Piperaceae

- * *Piper flavimarginatum* C. DC.
- * *Piper miniatum* Blume
- Piper muricatum* Blume - NRS1187

Polygalaceae

- *† *Xanthophyllum affine* Korth. - NRS0995
- † *Xanthophyllum ellipticum* Korth.
- † *Xanthophyllum obscurum* Benn.
- † *Xanthophyllum vitellinum* (Blume) Dietr.

Rhamnaceae

- Ventilago malaccensis* (Lour.) Merr. - Maxwell 81-64 (1 Apr 1981)
- * *Ziziphus elegans* Wall.

Rhizophoraceae

- *† *Carallia brachiata* (Lour.) Merr. - Maxwell 81-102 (28 May 1981)
- *† *Gynotroches axillaris* Blume - Sidek & Ali SK620 (9 Dec 1982)
- *† *Pellacalyx axillaris* Korth. - NRS0146

Rosaceae

- * *Prunus arborea* (Blume) Kalkman
- * *Prunus grisea* (C. Muell.) Kalkman
- † *Prunus polystachya* (Hook f.) Kalkman - NRS0191

Rubiaceae

- * *Aidia corymbosa* (Blume) K.M. Wong (*Randia auriculata*)
- Aidia wallichiana* Tirveng. - Ridley 5662 (1892)
- * *Caelospermum truncatum* (Wall.) Baill. ex K. Schum.
- Canthium horridum* Blume - NRS0044
- Chasalia chartacea* Craib - NRS1025
- Coptosapelta griffithii* Hook.f. - Mat 6891 (1895)
- † *Diplospora malaccensis* Hook.f. - NRS0763
- Gardenia griffithii* Hook.f. - Hullett 611 (21 Aug 1888)
- Gynochthodes sub lanceolata* Miq. - Samsuri Ahmad 1521 (17 Sep 1981)
- Hedyotis capitellata* Wall. ex G. Don - DJM166
- Hedyotis congesta* R.Br. ex G. Don - DJM139
- * *Hydnophytum formicarum* Jack
- Ixora coccinea* Hook.f. - Mat 6714 (1894)
- * *Ixora congesta* Roxb.
- Ixora lobbii* King & Gamble - NRS2410
- Ixora pendula* Jack - Ridley 5676
- *† *Jackiopsis ornata* (Wall.) Ridsdale (*Jackia ornata*)
- Lasianthus appressus* Hook.f. or *L. attenuatus* Jack - NRS0998
- Lasianthus attenuatus* Jack - NRS0023
- Lasianthus constrictus* Wight - NRS0034
- Lasianthus densifolius* Miq. - NRS0756

- * *Lasianthus griffithii* Wight - NRS1949
- Lasianthus ridleyi* King & Gamble - Maxwell 82-100 (7 Apr 1982)
- * *Lecananthus erubescens* Jack
- Lucinaea membranaea* King - NRS0862
- Morinda citrifolia* L. - NRS0167
- * *Morinda ridleyi* (King & Gamble) Ridl. - Maxwell 81-235 (3 Dec 1981)
- * *Morinda rigida* Miq.
- Morinda umbellata* L. - NRS2411
- Mussaenda glabra* Vahl - NRS0047
- *† *Mussaendopsis beccariana* Baill. - NRS0991
- * *Myrmecodia tuberosa* Jack
- † *Ophiorrhiza singaporensis* Ridl. - NRS0165
- * *Oxyceros scandens* (Blume) Tirveng. (*Randia clarkei*)
- * *Pavetta wallichiana* Steud. (*Pavetta indica*) - NRS0759
- Porterandia anisophylla* (Jack ex Roxb.) Ridl. - NRS0852
- Prismatomeris glabra* (Korth.) Valeton - Ridley 6150 (Apr 1894)
- Psychotria* sp. 9 - Hullett s.n. (1896)
- * *Psychotria maingayi* Hook.f.
- * *Psychotria obovata* Wall.
- Psychotria penangensis* Hook.f. - NRS0770
- Psychotria sarmentosa* Blume - NRS0173
- * *Rothmannia macrophylla* (R.Br. ex Hook.f.) Bremek. (*Randia macrophylla*)
- * *Tarenna adpressa* (King) Merr.
- Tarenna odorata* (Roxb.) B.L. Rob. - NRS0871
- * *Timonius flavescens* (Jack) Baker - Maxwell 81-82 (29 Apr 1981)
- * *Timonius wallichianus* (Korth.) Valeton - NRS0857
- * *Uncaria acida* (Hunter) Roxb. (*Uncaria ovalifolia*)
- Uncaria cordata* (Lour.) Merr. - DJM172
- Uncaria gambir* (Hunter) Roxb. - Maxwell 82-50 (17 Feb 1982)
- Uncaria lanosa* Wall. var. *glabrata* (Blume) Ridsdale
- Uncaria longiflora* (Poir.) Merr. var. *pteropoda* (Miq.) Ridsdale - Ridley s.n.
- Urophyllum blumeianum* (Wight) Hook.f. - NRS0752
- * *Urophyllum glabrum* Wall. - NRS0162
- Urophyllum* sp. 2 of Wong (Tree Flora of Malaya Vol. 4) - NRS0176
- * *Urophyllum streptopodium* Wall. ex Hook.f.

Rutaceae

- Glycosmis chlorosperma* (Blume) Spreng. - Ridley 3912 (1892)
- Luvunga crassifolia* Tanaka - NRS0635
- Maclurodendron porteri* (Hook.f.) T.G. Hartley - Hill & Samsuri H3017 (22 Oct 1971)

Sapindaceae

- * *Lepisanthes fruticosa* (Roxb.) Leenh.
- Nephelium cuspidatum* Blume var. *eriopetalum* (Miq.) Leenh.
- * *Nephelium lappaceum* L. (*N. glabrum*) - NRS0006
- * *Nephelium laurinum* Blume - Ridley 6211 (Apr 1894)
- *† *Pometia pinnata* Forst. - Sinclair SFN40519 (22 Dec 1954)
- Xerospermum noronhianum* Blume - Ridley s.n. (1894)

Sapotaceae

- *† *Ganua motleyana* (de Vr.) Pierre ex Dubard
Madhuca malaccensis (C.B. Clarke) Lam - Mat 6500 (1894)
- * *Palaquium hexandrum* (Griff.) Baill.
Palaquium gutta (Hook.f.) Baill. - Hill & Samsuri H3038 (22 Oct 1971)
- *† *Palaquium rostratum* (Miq.) Burck
- *† *Palaquium xanthochymum* (de Vr.) Pierre - Ridley 3774 (1892)
- * *Planchonella maingayi* (C.B. Clarke) van Royen

Smilacaceae

- Smilax setosa* Miq. - NRS0129
- Smilax calophylla* Wall. - NRS0997

Sterculiaceae

- Byttneria maingayi* Mast. - Maxwell 82-59 (26 Feb 1982)
- Commersonia bartramia* (L.) Merr. - NRS1018
- * *Heritiera elata* Ridl.
Scaphium linearicarpum (Mast.) Pierre - Himat (?) s.n. (11 Oct 1956)
- † *Scaphium macropodum* (Miq.) Beumee ex Heyne
- * *Sterculia coccinea* Jack - NRS0121
- † *Sterculia cordata* Blume
- * *Sterculia gilva* Miq. (*Sterculia bicolor*)
- *† *Sterculia macrophylla* Vent. - Samsuri Ahmad 1455 (8 Mar 1977)
- *† *Sterculia rubiginosa* Vent. - Samsuri Ahmad 1395 (9 Feb 1977)

Symplocaceae

- * *Symplocos barringtoniifolia* Brand - Maxwell 82-180 (1 July 1982)
- † *Symplocos fasciculata* Zoll.

Taccaceae

- * *Tacca integrifolia* Ker-Gawl. - Goodenough s.n. (14 Apr 1890)

Theaceae

- Adinandra acuminata* Korth. - Ridley s.n. (1894)
- Adinandra dumosa* Jack - NRS0198
- † *Eurya acuminata* DC. - NRS0052
- Gordonia penangensis* Ridl. - Ridley 3913 (1892)
- † *Pyrenaria acuminata* Planch. ex Choisy - NRS1016

Thymelaeaceae

- *† *Aquilaria malaccensis* Lam.
- Enkleia malaccensis* Griff. - DJM153

Tiliaceae

- * *Grewia acuminata* Juss. (*Grewia umbellata*) - NRS0185
- *† *Microcos blattifolia* (Corner) Rao (*Grewia blattifolia*)
- *† *Pentace triptera* Mast.

Ulmaceae

- * *Gironniera parvifolia* Planch.

Verbenaceae

- * *Clerodendrum deflexum* Wall. - NRS1009
- Clerodendrum laevifolium* Blume - NRS0758
- Clerodendrum paniculatum* L. - NRS0846
- * *Clerodendrum villosum* Blume - NRS0005
- Vitex pinnata* L. - NRS0136

Viscaceae

- Viscum articulatum* Burm.f. - Ridley 8054 (1896)
- Viscum ovalifolium* Wall. ex DC. - Ridley s.n. (1896)

Vitaceae

- Ampelocissus elegans* (Kurz) Gagnep. - NRS0011
- Ampelocissus gracilis* (Wall.) Planch. - NRS1170
- * *Cayratia mollissima* (Wall.) Gagnep. (*Vitis mollissima*) - DJM1696
- * *Cissus hastata* (Miq.) Planch. (*Vitis hastata*) - NRS0187
- * *Cissus nodosa* Blume (*Vitis glaberrima*) - Ridley 6789 (7 Aug 1895)
- Cissus repens* Lam. - NRS0884
- Pterisanthes eriopoda* (Miq.) Planch. - Ridley 425 (Nov 1889)
- * *Pterisanthes polita* (Miq.) Laws. - NRS0127

Zingiberaceae

- * *Amomum hastilabium* Ridl.
- * *Amomum xanthophlebium* Baker - Ridley s.n. (1899)
- Etlingera punicea* (Roxb.) R.M. Sm. - Maxwell 81-101 (28 May 1981)
- Globba leucantha* Miq. - Betty Allen s.n. (28 May 1949)
- * *Hornstedtia leonurus* (Koenig) Retz. - Ridley s.n. (1892)
- * *Hornstedtia scyphifera* (Koenig) Steud. -
- Plagiostachys lateralis* (Ridl.) Ridl. - Ridley s.n. (1892)
- Zingiber griffithii* Baker - NRS0787



Turner, I. M. et al. 1996. "Freshwater swamp forest in Singapore, with particular reference to that found around the Nee Soon Firing Ranges." *The Gardens' bulletin, Singapore* 48, 129–157.

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