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## AN UPDATED SURVEY OF MALESIAN SEED PLANTS FAMILIES

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### ABSTRACT

VAN BALGOOY, M.M.J. 2010. An updated survey of Malesian Seed Plants Families. *Reinwardtia* 13(2): 171–181. — The conservative family concept has been adopted on the Malesian Seed Plants Families I – III to show the visible characters to help identify specimen herbarium of the Malesian Plants. During a new classification of orders and families of flowering plants based on the molecular data has been led, some changes in family delimitation have occurred. By providing this family survey, the users of Malesian Seed Plants book can place their taxa in the correct family.

**Key words:** Malesian, Seed Plants, family, survey.

### ABSTRAK

VAN BALGOOY, M. M. J. 2010. Survei pembaruan buku Malesian Seed Plants. *Reinwardtia* 13(2):171–181. — Konsep suku yang konservatif digunakan dalam buku “Malesian Seed Plants Families I – III” untuk menunjukkan ciri yang mudah dilihat untuk membantu mengidentifikasi specimen herbarium untuk tumbuhan dari kawasan Malesia. Selama klasifikasi baru untuk bangsa dan suku dari tumbuhan berbunga yang didasarkan pada data molekular digunakan, beberapa perubahan dalam batasan suku terjadi. Dengan mengadakan survei suku ini, pengguna buku *Malesian Seed Plants* dapat meletakkan taksanya dalam suku yang betul.

**Kata kunci:** Malesian, Seed Plants, famili, survei.

### INTRODUCTION

In my handbooks for recognition of Malesian Seed plants (Van Balgooy 1997, 1998, 2001) I adopted a conservative family concept. These publications were mainly intended to help identify herbarium material of Malesian plants by means of characters visible with some training, experience and perseverance. Apparently these books fill a need and I have been assured from various sides that they are frequently being consulted. A CD version (Malesian Key Group, 2004) does not seem to enjoy the same popularity.

Recent molecular research has resulted in a new classification of orders and families of flowering plants (Mabberley 2008, Chase 2009). Some of the changes in family delimitation were expected on morphological grounds. Examples: the inclusion of *Asclepiadaceae* in *Apocynaceae*, the transfer of many *Verbenaceae* genera to the *Lamiaceae*, and the merging of *Bombacaceae*, *Malvaceae*, *Sterculiaceae* and *Tiliaceae* into a single family *Malvaceae*. As could be predicted the *Liliaceae* and *Saxifragaceae* have been dismembered. However, some of the changes are not so evident from a morphological viewpoint such as the inclusion of many *Flacourtiaceae* genera in the *Salicaceae*, the

complete overhaul of the *Scrophulariaceae* and the removal of *Calophyllum* from the *Clusiaceae*.

In writing this update Mabberley's Plantbook was indispensable (Mabberley o.c.). New insights provided by the Angiosperm Phylogeny Group (Chase o.c.) have also been incorporated. The last word in family classification is far from being said. Continued molecular research will no doubt lead to new family arrangements. By providing this survey I can do no more than provide a snapshot of current views, thus enabling users of my books to place their taxa in the “correct” family.

In the family survey the number preceding the family name refers to the comments following the survey. The number following the family name indicates the number of genera in the family represented in Malesia by indigenous species. This figure is largely based on the checklist by Van Steenis (1987). The figure in brackets is the number of naturalized genera. An asterisk (\*) before a name means that the family was not recognized in my seed plant books. The name in brackets following a name indicates the family upon which the new family is based. Examples: \**Achariaceae* (*Flacourtiaceae* p.p.) means that the new family *Achariaceae* contains part of the genera formerly placed in *Flacourtiaceae*. A family no longer

recognized is indicated by “see”. Example: *Flacourtiaceae* see *Achariaceae* and *Salicaceae*. A family name in brackets is an alternative name e.g. *Poaceae* (*Graminae*). It can also mean that the family in brackets was considered distinct in my books. Example *Amaranthaceae* (*Chenopodiaceae*). An arrow (↑) following a name means that the

family is represented in Malesia by naturalized species e.g. *Cactaceae* of which some species have firmly established themselves in the vegetation. Families represented only by cultivated non-naturalized species have not been included, e.g. *Caricaceae*. A family or genus represented by both naturalized and native species is considered native.

### Family survey

Notes	Family	Naturalized Genera	Number of native Genera
1	<i>Acanthaceae</i> ( <i>Verbenaceae</i> pp., <i>Avicennia</i> )	(5)	40
54	<i>Aceraceae</i> see <i>Sapindaceae</i>		
2 *	<i>Achariaceae</i> ( <i>Flacourtiaceae</i> p.p.)		7
3 *	<i>Acoraceae</i> ( <i>Araceae</i> p.p.)		1
	<i>Actinidiaceae</i>		2
	<i>Agavaceae</i> see <i>Asparagaceae</i>		
	<i>Aizoaceae</i>		4
	<i>Alangiaceae</i> see <i>Cornaceae</i>		
	<i>Alismataceae</i> ( <i>Butomaceae</i> p.p., <i>Limnocharitaceae</i> )	(1)	5
	<i>Alseuosmiaceae</i>		1
4 *	<i>Altingiaceae</i> ( <i>Hamamelidaceae</i> p.p.)		1
5	<i>Amaranthaceae</i> ( <i>Chenopodiaceae</i> )	(4)	20
6	<i>Amaryllidaceae</i>	(1)	4
	<i>Anacardiaceae</i>		22
	<i>Ancistrocladaceae</i>		1
7 *	<i>Anisophylleaceae</i> ( <i>Rhizophoraceae</i> p.p.)		2
	<i>Annonaceae</i>		50
8	<i>Apiaceae</i> ( <i>Umbelliferae</i> )	(4)	10
9	<i>Apocynaceae</i> ( <i>Asclepiadaceae</i> )	(4)	83
	<i>Aponogetonaceae</i>		1
	<i>Aquifoliaceae</i>		1
10	<i>Araceae</i> ( <i>Lemnaceae</i> )	(4)	45
11	<i>Araliaceae</i>		14
	<i>Araucariaceae</i> ( <i>Coniferales</i> p.p.)		2
	<i>Arecaceae</i> ( <i>Palmae</i> )		50
	<i>Aristolochiaceae</i>		2
	<i>Asclepiadaceae</i> see <i>Apocynaceae</i>		
12	<i>Asparagaceae</i> ( <i>Agavaceae</i> )	(1)	12
13 *	<i>Asteliaceae</i> ( <i>Liliaceae</i> p.p.)		1
	<i>Asteraceae</i> ( <i>Compositae</i> )	(30)	64
14 *	<i>Atherospermataceae</i> ( <i>Monimiaceae</i> p.p.)		1
	<i>Balanophoraceae</i>		4
	<i>Balsaminaceae</i>		2
	<i>Basellaceae</i> ↑	(2)	

Notes	Family	Naturalized Genera	Number of native Genera
	<i>Bataceae</i>		1
	<i>Begoniaceae</i>		2
	<i>Berberidaceae</i>		2
	<i>Bignoniaceae</i>	(3)	14
15	<i>Bixaceae (Cochlospermaceae)</i>		1
	<i>Bombacaceae see Malvaceae</i>		
16 *	<i>Bonnetiaceae (Theaceae p.p.)</i>		1
17	<i>Boraginaceae (Hydrophyllaceae)</i>		15
	<i>Brassicaceae (Cruciferae)</i>	(2)	3
	<i>Burmanniaceae</i>		3
	<i>Burseraceae</i>		9
	<i>Butomaceae see Alismataceae</i>		
	<i>Buxaceae</i>		2
	<i>Byblidaceae</i>		1
	<i>Cabombaceae (Nymphaeaceae p.p.)</i>	(1)	1
	<i>Cactaceae</i> ↑	(1)	
	<i>Calceolariaceae</i> ↑ ( <i>Scrophulariaceae p.p.</i> )	(1)	
	<i>Calophyllaceae (Clusiaceae p.p.)</i>		1
	<i>Callitrichaceae see Plantaginaceae</i>		
	<i>Campanulaceae</i>		5
18	<i>Cannabaceae (Ulmaceae p.p.)</i>	(1)	5
	<i>Cannaceae</i> ↑	(1)	
	<i>Capparaceae</i>		5
19	<i>Caprifoliaceae (Dipsacaceae, Valerianaceae)</i>		5
	<i>Cardiopteridaceae</i>		1
19 *	<i>Carlemanniaceae (Caprifoliaceae p.p.)</i>		1
	<i>Cartonemaceae see Commelinaceae</i>		
	<i>Caryophyllaceae</i>	(2)	8
	<i>Casuarinaceae</i>		3
20	<i>Celastraceae</i>		16
	<i>Centrolepidaceae</i>		2
20 *	<i>Centroplacaceae (Celastraceae p.p. Bhesa)</i>		1
	<i>Ceratophyllaceae</i>		1
	<i>Chenopodiaceae see Amaranthaceae</i>		
	<i>Chloranthaceae</i>		4
	<i>Chrysobalanaceae</i>		7
	* <i>Cleomaceae (Capparaceae p.p.)</i>		1
	<i>Clethraceae</i>		1
21	<i>Clusiaceae (Guttiferae)</i>		4
	<i>Cochlospermaceae see Bixaceae</i>		
22 *	<i>Colchicaceae (Liliaceae p.p.)</i>		4
	<i>Combretaceae</i>		5
	<i>Commelinaceae (Cartonemaceae)</i>		11

Notes	Family	Naturalized Genera	Number of native Genera
	<i>Coniferales</i> see <i>Araucariaceae</i> , <i>Cupressaceae</i> , <i>Pinaceae</i> , <i>Podocarpaceae</i> and <i>Taxaceae</i>		
	<i>Connaraceae</i>		5
	<i>Convolvulaceae</i>	(2)	20
	<i>Coriariaceae</i>		1
23	<i>Cornaceae</i> ( <i>Alangiaceae</i> , <i>Nyssaceae</i> )		3
	<i>Corsiaceae</i>		1
	<i>Corynocarpaceae</i>		1
	<i>Costaceae</i>		2
	<i>Crassulaceae</i>		2
	<i>Cruciferae</i> see <i>Brassicaceae</i>		
	<i>Crypteroniaceae</i>		3
24 *	<i>Ctenolophonaceae</i> ( <i>Linaceae</i> p.p.)		1
	<i>Cucurbitaceae</i>	(8)	29
	<i>Cunoniaceae</i>		9
	<i>Cupressaceae</i> ( <i>Coniferales</i> p.p.)		1
	<i>Cycadaceae</i>		1
*	<i>Cymodoceaceae</i> ( <i>Potamogetonaceae</i> p.p.)		4
	<i>Cyperaceae</i>		30
	<i>Daphniphyllaceae</i>		1
61	<i>Datisceae</i>		1
	<i>Dichapetalaceae</i>		1
	<i>Dilleniaceae</i>		5
	<i>Dioscoreaceae</i>		3
	<i>Dipsacaceae</i> see <i>Caprifoliaceae</i>		
	<i>Dipterocarpaceae</i>		10
	<i>Droseraceae</i>		2
	<i>Ebenaceae</i>		1
	<i>Elaeagnaceae</i>		1
	<i>Elaeocarpaceae</i>		5
	<i>Elatinaceae</i>		2
25	<i>Epacridaceae</i> see <i>Ericaceae</i>		
25	<i>Ericaceae</i> ( <i>Epacridaceae</i> )		15
	<i>Eriocaulaceae</i>		1
26 *	<i>Erythropalaceae</i> ( <i>Olacaceae</i> p.p.)		3
	<i>Erythroxylaceae</i>		1
27 *	<i>Escaloniaceae</i>		1
28	<i>Euphorbiaceae</i>	(3)	69
	<i>Eupomatiaceae</i>		1
	<i>Fabaceae</i> ( <i>Leguminosae</i> )	(18)	130
29	<i>Fagaceae</i>		4
30	<i>Flacourtiaceae</i> see <i>Achariaceae</i> and <i>Salicaceae</i>		
	<i>Flagellariaceae</i>		1
31 *	<i>Gelsemiaceae</i> ( <i>Loganiaceae</i> p.p.)		1

Notes	Family	Naturalized Genera	Number of native Genera
	<i>Gentianaceae</i>		10
	<i>Geraniaceae</i>		1
	<i>Gesneriaceae</i>		28
	<i>Gnetaceae</i>		2
	<i>Goodeniaceae</i>		5
	<i>Gramineae</i> see <i>Poaceae</i>		
32 *	<i>Gunneraceae</i> ( <i>Haloragaceae</i> p.p.)		1
	<i>Guttiferae</i> see <i>Clusiaceae</i>		
	<i>Haemodoraceae</i>		1
32	<i>Haloragaceae</i>		3
	<i>Hamamelidaceae</i>		6
33 *	<i>Hanguanaceae</i> ( <i>Agavaceae</i> p.p.)		1
	<i>Heliconiaceae</i> ( <i>Strelitzeaceae</i> p.p.)		1
	<i>Hemerocallidaceae</i> see <i>Xanthorrhoeaceae</i>		
	<i>Hernandiaceae</i>		3
	<i>Himantandraceae</i>		1
55 *	<i>Hydrangeaceae</i> ( <i>Saxifragaceae</i> p.p.)		3
	<i>Hydrocharitaceae</i>		10
17 *	<i>Hydroleaceae</i> ( <i>Hydrophyllaceae</i> p.p.)		1
17	<i>Hydrophyllaceae</i> see <i>Hydroleaceae</i>		
	<i>Hypericaceae</i> ( <i>Clusiaceae</i> p.p.)		2
	<i>Hypoxidaceae</i> ( <i>Amaryllidaceae</i> p.p.)		2
34	<i>Icacinaceae</i>		20
	<i>Illiciaceae</i> see <i>Schisandraceae</i>		
	<i>Iridaceae</i>	(3)	2
57 *	<i>Irvingiaceae</i> ( <i>Simaroubaceae</i> p.p.)		1
55 *	<i>Iteaceae</i> ( <i>Saxifragaceae</i> p.p.)		1
35 *	<i>Ixonanthaceae</i> ( <i>Linaceae</i> p.p.)		2
	<i>Joinvilleaceae</i> ( <i>Flagellariaceae</i> p.p.)		1
	<i>Juglandaceae</i>		1
	<i>Juncaceae</i>		2
	<i>Juncaginaceae</i>		1
	<i>Lamiaceae</i> ( <i>Labiatae</i> )		45
	<i>Lauraceae</i>		21
	<i>Lecythidaceae</i>		6
	<i>Leeaceae</i> see <i>Vitaceae</i>		
	<i>Lemnaceae</i> see <i>Araceae</i>		
	<i>Lentibulariaceae</i>		1
36	<i>Liliaceae</i>		2
37	<i>Linaceae</i>		3
56 *	<i>Linderniaceae</i> ( <i>Scrophulariaceae</i> p.p.)		6
38	<i>Loganiaceae</i>		9
	<i>Lophopyxidaceae</i>		1
	<i>Loranthaceae</i>		25

Notes	Family	Naturalized Genera	Number of native Genera
	<i>Lowiaceae</i>		1
39	<i>Lythraceae</i> ( <i>Sonneratiaceae</i> , <i>Trapaceae</i> )	(3)	8
40	<i>Magnoliaceae</i>		1
	<i>Malpighiaceae</i>		5
41	<i>Malvaceae</i> ( <i>Bombacaceae</i> , <i>Sterculiaceae</i> , <i>Tiliaceae</i> )	(10)	45
	<i>Marantaceae</i>		8
	<i>Melastomataceae</i>	(3)	35
	<i>Meliaceae</i>		20
	<i>Menispermaceae</i>		25
	<i>Menyanthaceae</i>		2
*	<i>Mitrastemonaceae</i> ( <i>Rafflesiaceae</i> p.p.)		1
	<i>Molluginaceae</i>		2
	<i>Monimiaceae</i>		11
	<i>Moraceae</i>	(2)	14
	<i>Moringaceae</i> ↑	(1)	
	<i>Musaceae</i>		2
42 *	<i>Myodocarpaceae</i> ( <i>Araliaceae</i> p.p.)		1
56	<i>Myoporaceae</i> see <i>Scrophulariaceae</i>		
	<i>Myricaceae</i>		1
	<i>Myristicaceae</i>		6
	<i>Myrsinaceae</i> see <i>Primulaceae</i>		
	<i>Myrtaceae</i>	(2)	34
	<i>Najadaceae</i> see <i>Hydrocharitaceae</i>		
36 *	<i>Narthesiaceae</i> ( <i>Liliaceae</i> p.p.)		1
*	<i>Nelumbonaceae</i> ( <i>Nymphaeaceae</i> p.p.)		1
	<i>Nepenthaceae</i>		1
43 *	<i>Nothofagaceae</i> ( <i>Fagaceae</i> p.p.)		1
	<i>Nyctaginaceae</i>		2
	<i>Nymphaeaceae</i>		1
	<i>Nyssaceae</i> see <i>Cornaceae</i>		
	<i>Ochnaceae</i>		9
44	<i>Olacaceae</i>		4
	<i>Oleaceae</i>		8
	<i>Onagraceae</i>	(1)	2
	<i>Opiliaceae</i>		7
	<i>Orchidaceae</i>		207
56	<i>Orobanchaceae</i>		8
	<i>Oxalidaceae</i>		4
	<i>Palmae</i> see <i>Arecaceae</i>		
28 *	<i>Pandaceae</i> ( <i>Euphorbiaceae</i> p.p.)		2
	<i>Pandanaceae</i>		3
	<i>Papaveraceae</i> ↑	(1)	
45 *	<i>Paracryphiaceae</i> ( <i>Saxifragaceae</i> p.p., <i>Sphenostemonaceae</i> )		2
	<i>Passifloraceae</i> ( <i>Turneraceae</i> ↑)	(2)	4



Notes	Family	Naturalized Genera	Number of native Genera
*	<i>Paulowniaceae (Scrophulariaceae p.p.)</i>		1
	<i>Pedaliaceae</i>		1
	<i>Pentaphragmataceae</i>		1
46	<i>Pentaphyllacaceae (Theaceae p.p.)</i>		2
	<i>Pentastemonaceae see Stemonaceae</i>		
36 *	<i>Petrosaviaceae (Liliaceae p.p.)</i>		1
47	<i>Philesiaceae</i>		1
	<i>Philydraceae</i>		2
56 *	<i>Phrymaceae (Scrophulariaceae p.p.)</i>		2
28 *	<i>Phyllanthaceae (Euphorbiaceae p.p.)</i>		18
	<i>Phytolaccaceae</i> †	(2)	
28 *	<i>Picrodendraceae (Euphorbiaceae p.p.)</i>		4
	<i>Pinaceae (Coniferales p.p.)</i>		1
	<i>Piperaceae</i>		4
	<i>Pittosporaceae</i>		3
48	<i>Plantaginaceae</i>	(5)	16
	<i>Plumbaginaceae</i>		2
	<i>Poaceae (Graminae)</i>	(23)	155
	<i>Podocarpaceae (Coniferales p.p.)</i>		6
	<i>Podostemaceae</i>		3
	<i>Polygalaceae</i>		6
	<i>Polygonaceae</i>		4
	<i>Pontederiaceae</i>		1
	<i>Portulacaceae</i>		2
49	<i>Potamogetonaceae</i>		2
50	<i>Primulaceae (Myrsinaceae)</i>		19
	<i>Proteaceae</i>		9
	<i>Punicaceae</i> *	(1)	
28 *	<i>Putranjivaceae (Euphorbiaceae p.p.)</i>		1
	<i>Rafflesiaceae</i>		2
	<i>Ranunculaceae</i>		5
	<i>Restionaceae</i>		1
	<i>Rhamnaceae</i>		11
7	<i>Rhizophoraceae</i>		7
*	<i>Ripogonaceae (Smilacaceae p.p.)</i>		1
	<i>Rosaceae</i>		12
51 *	<i>Rousseaceae (Saxifragaceae p.p.)</i>		1
	<i>Rubiaceae</i>	(4)	140
*	<i>Ruppiaceae (Potamogetonaceae p.p.)</i>		1
	<i>Rutaceae</i>		39
	<i>Sabiaceae</i>		2
52	<i>Salicaceae (Flacourtiaceae p.p., Scyphostegiaceae)</i>		13
	<i>Salvadoraceae</i>		1
53	<i>Santalaceae (Viscaceae)</i>		13

Notes	Family	Naturalized Genera	Number of native Genera
54	<i>Sapindaceae (Aceraceae)</i>	(2)	40
	<i>Sapotaceae (Sarcospermaceae)</i>		15
	<i>Saururaceae</i>		1
55	<i>Saxifragaceae</i>		1
	<i>Schisandraceae (Illiciaceae)</i>		3
44 *	<i>Schoepfiaceae (Olacaceae p.p.)</i>		1
56	<i>Scrophulariaceae (Loganiaceae p.p., Myoporaceae)</i>		2
	<i>Scyphostegiaceae</i> see <i>Salicaceae</i>		
57	<i>Simaroubaceae</i>		7
	<i>Smilacaceae</i>		2
	<i>Solanaceae</i>	(7)	1
	<i>Sonneratiaceae</i> see <i>Lythraceae</i>		
	<i>Sparganiaceae</i> see <i>Typhaceae</i>		
	<i>Sphenocleaceae</i>		1
	<i>Stackhousiaceae</i> see <i>Celastraceae</i>		
	<i>Staphyleaceae</i>		1
58	<i>Stemonaceae (Pentastemonaceae)</i>		3
*	<i>Stemonuraceae (Icacinaceae p.p.)</i>		1
	<i>Sterculiaceae</i> see <i>Malvaceae</i>		
59	<i>Strelitzeaceae</i> ↑ see <i>Heliconiaceae</i>	(2)	
	<i>Stylidiaceae</i>		1
	<i>Styracaceae</i>		2
57 *	<i>Surianaceae (Simaroubaceae p.p.)</i>		1
	<i>Symplocaceae</i>		1
	<i>Taccaceae</i>		1
	<i>Taxacaceae (Coniferales p.p.)</i>		1
60 *	<i>Tetrameristaceae (Theaceae p.p.)</i>		1
61 *	<i>Tetramelaceae (Datiscaceae p.p.)</i>		1
60	<i>Theaceae</i>		8
	<i>Thymelaeaceae</i>		12
	<i>Tiliaceae</i> see <i>Malvaceae</i>		
11 *	<i>Toricelliaceae (Araliaceae p.p.)</i>		1
	<i>Trapaceae</i> see <i>Lythraceae</i>		
	<i>Trigoniaceae</i>		1
	<i>Trimeniaceae</i>		1
	<i>Triuridaceae</i>		1
	<i>Turneraceae</i> ↑ see <i>Passifloraceae</i>		
62	<i>Typhaceae (Sparganiaceae)</i>		2
63	<i>Ulmaceae</i>		1
	<i>Umbelliferae</i> see <i>Apiaceae</i>		
	<i>Urticaceae</i>		25
	<i>Valerianaceae</i> see <i>Caprifoliaceae</i>		
64	<i>Verbenaceae</i> ↑	(5)	
	<i>Violaceae</i>		4
53	<i>Viscaceae</i> see <i>Santalaceae</i>		
65	<i>Vitaceae (Leeaceae)</i>		9
	<i>Winteraceae</i>		12
66	<i>Xanthorrhoeaceae (Hemerocallidaceae)</i>		6
	<i>Xyridaceae</i>		1
	<i>Zingiberaceae</i>		25
*	<i>Zosteraceae (Potamogetonaceae p.p.)</i>		1
	<i>Zygophyllaceae</i>		1
	<i>Umbelliferae</i> see <i>Apiaceae</i>		
	<i>Urticaceae</i>		25

Notes	Family	Naturalized Genera	Number of native Genera
64	<i>Valerianaceae</i> see <i>Caprifoliaceae</i> <i>Verbenaceae</i> † <i>Violaceae</i>	(5)	4
53	<i>Viscaceae</i> see <i>Santalaceae</i>		
65	<i>Vitaceae</i> ( <i>Leeaceae</i> ) <i>Winteraceae</i>		9 12
66	<i>Xanthorrhoeaceae</i> ( <i>Hemerocallidaceae</i> ) <i>Xyridaceae</i>		6 1
*	<i>Zingiberaceae</i> <i>Zosteraceae</i> ( <i>Potamogetonaceae</i> p.p.) <i>Zygophyllaceae</i>		25 1 1

In his checklist Van Steenis recognized 239 families of which 23 only were represented by naturalized or cultivated species, thus accepting 216 native families. In my plant books I adopted a slightly less conservative family concept and accepted 235 families of which 8 only are represented by naturalized species. In the present survey there are 255 indigenous and 10 naturalized families. Van Steenis listed 2382 genera with indigenous species, whereas in the present survey 2403 genera are accepted and 191 genera only represented by naturalized species..

#### Notes

- 1 *Avicennia*, now placed in *Acanthaceae* (formerly in *Verbenaceae* or in *Avicenniaceae*) differs from the rest of the family by the following features: mangrove trees with breathing roots, no cystoliths, viviparous.
- 2 *Achariaceae* split off from *Flacourtiaceae* accommodates the following genera: *Eleutherandra*, *Erythrospermum*, *Hydnocarpus*, *Pangium*, *Ryparosa*, *Scaphocalyx* and *Trichadenia*. See also notes 30 and 52.
- 3 *Acorus* is removed from *Araceae*, recognizable by its Iris like leaves. See also note 10.
- 4 *Altingia*, removed from *Hamamelidaceae* is placed in a monospecific family.
- 5 *Amaranthaceae* now harbours the genera formerly in *Chenopodiaceae*.
- 6 *Allium* † treated as *Liliaceae* in Mal. Seed Pl. is now in *Amaryllidaceae*.
- 7 *Anisophyllea* and *Combretocarpus* are placed in a separate family from *Rhizophoraceae* as was expected. The leaves are alternate in *Anisophyllaceae* and opposite in *Rhizophoraceae*.
- 8 *Mackinlaya*, formerly in *Araliaceae*, has been moved to *Apiaceae*.
- 9 As could be predicted *Apocynaceae* now

includes the *Asclepiadaceae*.

- 10 *Acorus* has been removed from the *Araceae* but the *Lemnaceae* are added.
- 11 *Aralidium*, placed with some doubt in *Araliaceae*, is now in a separate family. *Mackinlaya* is now in *Apiaceae* and *Delarbrea* is now in a separate family, *Myodocarpaceae*.
- 12 *Asparagaceae* now accommodates some genera formerly placed in other families: *Cordyline* and *Dracaena* (ex *Agavaceae*), *Arthropodium*, *Asparagus*, *Chlorophytum*, *Disporopsis*, *Liriope*, *Ophiopogon*, *Peliosanthes*, *Thysanotus* and *Tupistra* (ex *Liliaceae*).
- 13 *Astelia*, formerly in *Liliaceae*, is now in *Asteliaceae*.
- 14 *Atherospermataceae* now harbours *Dryadodaphne* (ex *Monimiaceae*)
- 15 Next to the cultivated *Bixa*, the *Bixaceae* now harbours *Cochlospermum*.
- 16 *Ploiarium*, formerly in *Theaceae*, is now in *Bonnetiaceae* as has been suggested before.
- 17 *Hydrophyllaceae* has been reduced to *Boraginaceae*, but the sole representative of the family in Malesia, *Hydrolea*, has been placed in a separate family. The aberrant genus *Pteleocarpa* is retained in *Boraginaceae*.
- 18 *Cannabaceae*, so far only represented by the cultivated *Cannabis*, has been expanded to include several genera formerly in *Ulmaceae*: *Aphananthe*, *Celtis*, *Gironniera*, *Parasponia* and *Trema*. See also note 62.
- 19 *Caprifoliaceae* now also harbours *Triplostegia* (ex *Dipsacaceae*) and *Valeriana* (ex *Valerianaceae*) but *Carlemannia* is placed in a separate family.
- 20 *Bhesa*, easily recognized within the *Celastraceae* by its bipulvinate petiole and scalariform venation is placed in a separate family (*Centroplacaceae*). *Stackhousia* (*Stack-*

- housiaceae*) and *Parnassia* (formerly *Saxifragaceae*) have been added to the *Celastraceae*.
- 21 *Calophyllum* is removed from *Clusiaceae*.
- 22 *Colchicaceae* accommodates part of the former *Liliaceae*: *Disporum*, *Gloriosa*, *Iphigenia* and *Schellhammera*. See also note 36.
- 23 *Cornaceae*, apart from *Mastixia*, now also harbours *Alangium* (*Alangiaceae*) and *Nyssa* (*Nyssaceae*).
- 24 *Ctenolophon*, uncomfortably lodged in *Linaceae* is now in a family of its own. See also note 37.
- 25 *Epacridaceae* has been sunk in *Ericaceae*, but can easily be told apart by the very close longitudinal venation.
- 26 *Erythralum*, as expected is removed from *Olacaceae*, and is rather unexpectedly joined by *Scorodocarpus* and *Strombosia*, in a separate family.
- 27 *Polyosma* (ex *Saxifragaceae*) is the sole representative of the *Escalloniaceae* in Malesia. See also note 55.
- 28 *Euphorbiaceae* has always been a notoriously difficult family. During pre-identification sessions, whenever coming across an unknown specimen I used to say mockingly: "If in doubt say *Euphorbiaceae*". More often than once the guess proved to be correct. The removal of several genera to other families makes the family slightly less heterogeneous.  
*Pandaceae*: *Galearia*, *Microdesmis*.  
*Phyllanthaceae*: *Actephila*, *Antidesma*, *Aporosa*, *Baccaurea*, *Bischofia*, *Breynia*, *Bridelia*, *Dicoelia*, *Distichriops*, *Cleistanthus*, *Flueggea*, *Glochidion*, *Hymenocardia*, *Lep-topus*, *Margaritaria*, *Nothobaccaurea*, *Phyllanthus* and *Sauropus*.  
*Picrodendraceae*: *Austrobuxus*, *Choriceras*, *Kairothamnus* and *Petalostigma*  
*Putranjivaceae*: *Drypetes*.
- 29 As has been suggested before *Nothofagus* is removed from *Fagaceae*.
- 30 *Flacourtiaceae* has ceased to exist. *Flacourtia*, along with most other genera, has been transferred to *Salicaceae*, seven have moved to *Achariaceae*. See note 2. *Paropsia* now belongs to the *Passifloraceae*.
- 31 *Gelsemium* is removed from *Loganiaceae*. See also note 38.
- 32 *Gunnera* as has often been suggested before has been removed from *Haloragaceae*.
- 33 After moving from one family to another, *Hanguana* is now placed in a family of its own.
- 34 *Stemonurus*, formerly in *Icacinaceae*, is now in a separate family.
- 35 *Ixonanthaceae* split off from *Linaceae* also harbours *Allanthospermum*, formerly in *Simaroubaceae*.
- 36 *Liliaceae* has always been a catchall for doubtfully related genera. The genera accepted as belonging in this family in Mal. Seed Pl. are now placed as follows:  
*Asparagaceae*, see note 12  
*Asteliaceae*, see note 13  
*Colchicaceae*, see note 22  
*Narthesiaceae*: *Aletris*  
*Xanthorrhoeaceae*, see note 65.
- 37 *Linaceae* is represented by *Hugonia*, *Indorouchera* and *Philbornea*. See notes 24 and 35.
- 38 Several genera removed from *Loganiaceae* are back in the family, but *Buddleja* is now in *Scrophulariaceae* (see note 56) and *Gelsemium* in *Gelsemiaceae*. See note 31.
- 39 *Lythraceae* now includes the widely different *Sonneratiaceae* and *Trapaceae*.
- 40 All genera of the family in Malesia have been reduced to a single genus, *Magnolia*.
- 41 The enlarged family *Malvaceae* now comprises four families which have always been difficult to tell apart. On the other hand it has also been suggested to recognize ten families instead of one.
- 42 *Delarbrea* is now in a separate family. See also note 11.
- 43 Similarly *Nothofagus* has been removed from the *Fagaceae*.
- 44 *Erythralaceae* (see note 26) and *Schoepfiaceae* (*Schoepfia*) have been split off from *Olacaceae*.
- 45 The Malesian genera of this new family are *Quintinia* (ex *Saxifragaceae*) and *Sphenostemon* (ex *Sphenostemonaceae*).
- 46 *Ternstroemia* (ex *Theaceae*) is now in *Pentaphyllacaceae*.
- 47 *Eustrephus* is the only genus in *Philesiaceae*. *Geitonoplesium* has been moved to *Xanthorrhoeaceae*.
- 48 *Plantaginaceae* now harbours several genera formerly placed in other families: *Callitriche* (*Callitrichaceae*), *Bacopa*, *Brookea*, *Detzneria*, *Limnophila*, *Parahebe* and *Veronica* (*Scrophulariaceae*). See also note 56.
- 49 *Cymodoceaceae*, *Ruppiaceae* and *Zosteraceae* have been split off from *Potamogetonaceae*, which now only harbours *Potamogeton* and *Zannichelia*.
- 50 *Myrsinaceae*, including *Maesa*, have been sunk in *Primulaceae*.
- 51 *Carpodetus* (ex *Saxifragaceae*) is placed in a separate family *Rousseaceae*. See also note 55.
- 52 *Salicaceae* has been considerably enlarged by

- Scyphostegia* (*Scyphostegiaceae*) and the inclusion of most genera formerly in *Flacourtiaceae*. See also note 2.
- 53 *Viscaceae* is now part of the *Santalaceae*.
- 54 *Acer* now placed in the *Sapindaceae* can easily be distinguished from the rest of the family by its opposite leaves.
- 55 Dismemberment of the *Saxifragaceae* was to be expected. The only genus remaining in the family is *Astilbe*. The other genera have found other families:  
*Carpodetus* (*Rousseaceae*)  
*Deutzia*, *Dichroa* and *Hydrangea* (*Hydrangeaceae*)  
*Itea* (*Iteaceae*)  
*Polyosma* (*Escalloniaceae*)  
*Quintinia* (*Paracryphiaceae*)
- 56 The only indigenous genera of *Scrophulariaceae* are *Buddleja* (formerly *Loganiaceae*) and *Myoporum* (formerly *Myoporaceae*). All other genera have been moved to other families:  
*Linderniaceae* (i.e. *Microcarpaea*, *Picria* and *Torenia*)  
*Orobanchaceae* (i.e. *Buchnera*, *Centranthera*, *Euphrasia* and *Striga*)  
*Paulowniaceae* (*Wightia*)  
*Phrymaceae* (*Mazus*, *Mimulus*)  
*Plantaginaceae* see note 48.
- 57 As expected *Simaroubaceae* has also undergone changes:  
*Allantospermum* is now in *Ixonanthaceae*, *Harrisonia* in *Rutaceae*, *Irvingia* in *Irvingiaceae*, *Suriana* in *Surianaceae*. The remaining 6 genera are retained in the family.
- 58 *Pentastemon* sunk into *Stemonaceae* can easily be distinguished from the rest of the family by being five-merous instead of two-merous.
- 59 *Strelitziaceae* is only represented in Malesia by introduced species (*Ravenala* and *Strelitzea*). *Heliconia* is now in *Heliconiaceae*.
- 60 Some genera formerly in *Theaceae* have now moved to other families: *Ploiarium* to *Bonnetiaceae*, *Ternstroemia* to *Pentaphragmataceae* and *Tetramerista* to *Tetrameristaceae*.
- 61 *Tetrameles* (ex *Datisceae*) is now in a separate family.
- 62 *Sparganium* despite completely different inflorescence is placed in *Typhaceae*.
- 63 Most genera formerly in *Ulmaceae* have been transferred to *Cannabaceae*. Only *Ulmus*

remains. See note 18.

- 64 If *Phyla* is native in Malesia it is the only representative of the *Verbenaceae*. All indigenous genera formerly in *Verbenaceae* are now in *Lamiaceae*.
- 65 *Leeaceae* (only genus *Leea*) once split off from *Vitaceae* is now back in that family.
- 66 *Xanthorrhoeaceae*, formerly only represented in Malesia by *Lomandra* and *Romnaldia* has been expanded to include *Geitonoplesium* (ex *Philesiaceae*), *Caesia*, *Dianella* and *Tricoryne* (ex *Liliaceae*).

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HARRY WIRIADINATA & RISMITA SARI. A new species of <i>Rafflesia</i> ( <i>Rafflesiaceae</i> ) from North Sumatra .....	95
ARY P. KEIM. A new species of <i>Freycinetia</i> ( <i>Pandanaceae</i> ) from Papua New Guinea.....	101
ROBERT GRADSTEIN <i>et al.</i> Bryophytes of Mount Patuha, West Java, Indonesia.....	107
ABDULROKHMAN KARTONEGORO & J. F. VELDKAMP. Revision of <i>Dissochaeta</i> ( <i>Melastomataceae</i> ) in Java, Indonesia.....	125
NURSAHARA PASARIBU. Two new species of <i>Freycinetia</i> ( <i>Pandanaceae</i> ) from Sumatra, Indonesia.....	147
ARY P. KEIM. & M. RAHAYU. <i>Pandanaceae</i> of Sumbawa, West Nusa Tenggara, Indonesia.....	151
K. MAT-SALEH, RIDHA MAHYUNI, AGUS SUSATYA, J. F. VELDKAMP. <i>Rafflesia lawangensis</i> ( <i>Rafflesiaceae</i> ), a new species from Bukit Lawang, Gunung Leuser National Park, North Sumatra, Indonesia.....	159
J. F. VELDKAMP & R. M. K. SAUNDERS. <i>Goniothalamus tripetalus</i> (Lam.) Veldk. & R. M. K. Saunders ( <i>Annonaceae</i> ), <i>comb. nov.</i> ....	167
M. M. J. VAN BALGOOY. An updated survey of Malesian Seed Plants Families.....	171
NURHAIDAH IRIANY SINAGA. Two new species of <i>Freycinetia</i> ( <i>Pandanaceae</i> ) from Manokwari, West Papua .....	183
NURHAIDAH IRIANY SINAGA, RITA MEGIA, ALEX HARTANA & ARY PRIHARDHYANTO KEIM. The ecology and distribution of <i>Freycinetia</i> Gaud. ( <i>Pandanaceae</i> ; <i>Freycinetioideae</i> ) in the Indonesian New Guinea.....	189
EIZI SUZUKI. Tree flora on freshwater wet habitats in lowland of Borneo: Does wetness cool the sites..	199
NANDA UTAMI & HARRY WIRIADINATA. <i>Impatiens mamasensis</i> ( <i>Balsaminaceae</i> ), a new Species from West Celebes, Indonesia.....	211
M. ARDIYANI, A. D. POULSEN, P. SUKSATHAN, F. BORCHSENIUS. <i>Marantaceae</i> in Sulawesi.....	213