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MANGROVE GUIDEBOOK FOR SOUTHEAST ASIA

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FOREWORDS

Large extents of the coastlines of Southeast Asian countries were once covered by thick mangrove forests. In the past few decades, however, these mangrove forests have been largely degraded and destroyed during the process of development. The negative environmental and socio-economic impacts on mangrove ecosystems have led many government and non-government agencies, together with civil societies, to launch mangrove conservation and rehabilitation programmes, especially during the 1990s. In the course of such activities, programme staff have faced continual difficulties in identifying plant species growing in the field. Despite a wide availability of mangrove guidebooks in Southeast Asia, none of these sufficiently cover species that, though often associated with mangroves, are not confined to this habitat. These species include not only grasses, herbs and ferns, but also trees, shrubs and climbers.

Experts working for Wetlands International in Indonesia realized this constraint and commenced preparation of a mangrove guidebook with this extended scope in mind. By 2002, information had been compiled for 204 species. At the beginning of 2003, Wetlands International proposed a partnership with FAO to produce a mangrove guidebook for the whole of Southeast Asia. Thus, a joint effort began. Two and a half years later, a 534 page manuscript with many illustrations had been prepared with the aid of reviews by national mangrove experts. Further editorial work continued by the authors from Wetlands International and FAO forestry officers.

After nearly three years of hard work, this mangrove guidebook has been completed, and it gives me great pleasure to introduce this unique publication to those who study, manage, conserve and utilize mangrove forests. This book will contribute to guiding more people, especially the younger generation, to learn about mangrove forests in Southeast Asia. Thus, it supports further advancement of mangrove conservation and rehabilitation programmes.

We should all acknowledge with thanks the work done by the main authors headed by Mr Wim Giesen, mangrove botanist for Wetlands International, Mr Stephan Wulffraat, forester, now with WWF Indonesia, two FAO foresters, Dr Mette Loyche Wilkie, Senior Forestry Officer, FAO, Rome, Italy, and Mr Masakazu Kashio, Forest Resources Officer, FAO Regional Office for Asia and the Pacific, Bangkok, Thailand, and all of the reviewers in many countries for their valuable contributions. Without their painstaking efforts, this publication would not have seen the light of day.

We would also like to express our appreciation to the "Forestry programme for early rehabilitation of Asian tsunami-affected countries (OSRO/GLO/502/FIN)", which is funded by the Government of Finland, for providing financial support to print the first 1 000 copies of this guidebook.

This publication is a useful tool for mangrove forest managers, foresters, coastal resource managers, scientists, students and interested lay persons, not only in Southeast Asian countries, but also in many other countries where mangroves grow.

He Changchui
Assistant Director-General and Regional Representative for
Asia and the Pacific
Food and Agriculture Organization of the United Nations

It is with great pleasure that I am writing the foreword for this guide to the mangroves of Southeast Asia. Its development started in 1991 when a young Dutch student, Stephan Wulffraat, entered my office in Bogor (Asian Wetland Bureau – Indonesia), inquiring about possibilities for an internship.

I had worked extensively along the coasts and in the mangrove swamps of West Malaysia and Sumatra and often found it tedious to identify various plant species associated with these magnificent areas; not so much the true mangroves – which comprise relatively few species – but the many species in the backswamps, the slightly elevated areas and the sandy ridges associated with this brackish water habitat. For these, no concise field guide existed. As a Dutch researcher I was used to the fantastic field guides that can be obtained in almost any bookshop in Europe. For students in Southeast Asia it is much more difficult to get acquainted with the tremendous biodiversity around them. There are many more species but hardly any field guides. They have to scramble through many incomplete inventories, herbaria and obscure scientific papers. I believe that this dearth of access to basic knowledge is one of the most significant constraints for both the public and young scientists in Southeast Asia to develop a true appreciation of their biologically rich environment. I believe that this also sustains the limited understanding and awareness of the ecology of mangroves and their incredible productivity and usefulness for people.

I suggested Stephan to start the development of a field guide to the mangroves and associated plants species of Indonesia. I did not foresee that this would become a long process, hampered by lack of funding but carried on through the enthusiasm and interest of its consecutive authors and the drawing talents of Wahyu Gumelar, Triana, Iskak Syamsudin and Tilla Visser. The most significant driving force of it all was Wim Giesen, who was involved from the start and in the end even took the step to expand the focus to Southeast Asia. I would like to thank FAO for their support in the development and publication of this guidebook.

At last, here it is. I am extremely pleased with the end result. I call on students and nature lovers of Southeast Asia to go out there, study and appreciate why and how mangroves should be managed and protected, and to become knowledgeable advocates for their plight. Too many valuable areas have been lost.

It is time to turn the tide.

Marcel Silvius

Senior Programme Manager
Wetlands International
Wageningen, The Netherlands

AUTHORS' PREFACE

The aim of this book is to provide those involved with the management and conservation of mangroves in Southeast Asia with a guidebook for identifying mangrove plants. At the same time, the book aims to provide a brief introduction to mangroves in general and Southeast Asia's mangroves in particular. This would then also be of use to students and interested lay persons. Accordingly, the book has been split into two parts: part one deals with the mangrove habitat in Southeast Asia, while part two focuses on the mangrove plants themselves. The core of the book is formed by the black-and-white drawings of mangrove plants, skilfully drawn by Wahyu Gumelar, Tilla Visser, Iskak Syamsudin and Triana at the Wetlands International – Indonesia Programme office in Bogor, West Java.

Various guidebooks exist for mangroves of Southeast Asia, but all have a limited geographic scope covering only one country: Malaysia (Watson, 1928), Papua New Guinea (Percival & Womersley, 1975), Indonesia (Kitamura *et al.*, 1997; Noor *et al.*, 1999) and the Philippines (Aragones *et al.*, 1998). An even more severe limitation of these guidebooks is that they focus almost exclusively on so-called 'true mangrove species' – i. e. species that occur in the mangrove habitat only and are not found in other habitats. While this is an approach that is common world-wide, the disadvantage is that many plant species found in the mangrove habitat are not dealt with, which can be most frustrating. Another disadvantage of most existing guidebooks is that they tend to ignore species other than trees and shrubs. Epiphytes and lianas, for example, are often ignored entirely even though some may only be found in mangroves.

Up to now, identifying all plants found in Southeast Asian mangroves was a daunting task, as comprehensive taxonomic works (or 'floras') of the region are bulky (Flora of Java, Tree Flora of Malaya), or both bulky and far from complete (Flora Malesiana, Flora of Thailand). The region is endowed with the world's largest expanse of mangrove that at the same time is also the world's most biologically diverse and varied in structure. This unparalleled natural heritage gives the region a particular responsibility, while providing a unique opportunity for all those wanting to study and enjoy this wondrous habitat.

This book represents the first attempt at covering all mangrove plant species in Southeast Asia, and is likely to be incomplete. The authors would therefore warmly welcome additional information, especially regarding geographic coverage and additional species not covered, so that this can be updated in future editions. Please forward your comments and suggestions to the lead author, Wim Giesen, at: wim.giesen@mottmac.nl

ACKNOWLEDGEMENTS

We would like to thank the many external experts who kindly gave their advice and assistance:

Taxonomists & herbaria

The late Dr A.J.G.J. ('Doc') Kostermans (Bogor Herbarium), Dra. J.J. Afriastini (for her kind help identifying specimens in the Bogor Herbarium), Ms Agustina Arobaya checked our orchid list for occurrence in Indonesian Papua, Dr Max van Balgooij (Rijksherbarium Leiden) and Dr E. Hennipman (Institute of Systematic Botany, University of Utrecht, The Netherlands). We thank the library staff of Bogor Herbarium for their kind help in locating (often very obscure) literature. Many thanks to the Royal Botanic Garden, Kew, especially Jim Kay and Trish Long for kindly providing illustrations of some of the most obscure and difficult to locate species, John Dransfield for providing contacts, and Jovita Yesilyurt for the digital image of *Schefflera lanceolata* – the last and most elusive. Lastly, lots of thanks also to Bogor Herbarium and Rijksherbarium Leiden for providing access to the herbarium collections and allowing us to make sketches, which made it possible to complete the illustrations that greatly enhance the usefulness of this book.

Other specialists

Jim Berdach, who provided us with information on protected mangroves and total mangrove area in the Philippines; Sim Cheng Hua, Sundari Ramakrishna and Murugadas Loganathan of Wetlands International Malaysia Programme for information about Malaysian mangroves; Tony Sebastian of Aonyx Environmental (Kuching) for information about mangroves of Brunei; Mam Kosal of Wetlands International Mekong Programme, Melissa Marschke of IDRC and Alvin Lopez of IUCN's Mekong Wetlands Programme for information about mangroves of Cambodia; and last-but-not-least Mette Loyche-Wilkie of FAO for information about the mangroves of Papua New Guinea and Myanmar.

Production team

We would like to especially thank the staff of Wetlands International – Indonesia Programme who assisted with the production of this volume in many ways, but especially with the production of the excellent line drawings. We would like to thank Nyoman Suryadiputra, Yus Rusila Noor, Wahyu Gumelar, Tilla Visser, Triana, Iskak Syamsudin, Rosie Ounsted, Endah Nirarita, Cecilia Luttrell, Penina Mampioper and George Sitania.

Thanks also goes to Taej Mundkur of Wetlands International Asia Programme, Sundari Ramakrishna of Wetlands International Malaysia Programme, and Marcel Silvius of Wetland International's headquarters in the Netherlands, for their enduring support. A lot of thanks also goes to Paul Giesen for the grim task of sorting out the two very long indexes, and for assisting with scanning of the literature. Special thanks go to Masakazu Kashio, FAO, Bangkok, for his final reviews, comments, editing and formatting, and arrangement for printing.

We acknowledge with great thanks the financial support of the FAO "Forestry programme for early rehabilitation of Asian tsunami-affected countries (OSRO/GLO/502/FIN)", which is funded by the Government of Finland, to print this guidebook.

Lastly, we would like to thank UNEP-WCMC for allowing us to reproduce the mangrove map of Southeast Asia, and the International Society for Mangrove Ecosystems (ISME, based in Okinawa, Japan) for their financial contribution towards the production of the Indonesian precursor of this guidebook.

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CHAPTER 1 INTRODUCTION

1.1 WHAT ARE MANGROVES ?

The term 'mangrove' is used to define both the plants that occur in tidal forests, and to describe the community itself (Tomlinson, 1986; Wightman, 1989). In this guidebook, 'mangrove' is generally used to refer to the habitat, and the meaning is usually obvious from the context. Elsewhere, the term 'mangal' is used by some authors (e.g. MacNae, 1968; Chapman, 1976, 1977; Ogino & Chihara, 1988) in reference to mangrove vegetation, but its usage has not met with much support apart from in the Americas, and 'mangal' is therefore not used in this publication.

Mangroves can be broadly defined as woody vegetation types occurring in marine and brackish environments. They are generally restricted to the tidal zone, which is the strip of coast starting from the lowest low water level up to the highest high water level (spring tide). With a few exceptions, they occur only in the tropics and sub-tropics, and their closest equivalent in temperate zones are herbaceous salt marshes. In this publication the term 'mangrove' is used in its broadest sense, i.e. also including the *Nypa* formation and the margins of mangroves. These margins are inundated a few times a year only, mainly during spring tides or due to storm surges, and frequently include species from adjacent vegetation types. The latter may include species from the beach '*Barringtonia* formations', other types of coastal forests, and from the sand dune '*Pes-capre* formation' (van Steenis, 1958; MacNae, 1968; Tomlinson, 1986).

Although mangroves are not as poorly known as many other tropical and subtropical forest habitats, many myths remain. In a tiny 2-page paper on *Mangrove mythology* Jane Snedaker (1997, quoted in Lewis, 2001) proposes a true or false test with five questions:

a. Mangroves require salt water to develop and grow.
b. Mangroves extend shorelines.
c. Mangroves build up land.
d. The red mangrove (*Rhizophora* species) are the most valuable mangroves.
e. Some mangrove forest types are more important than others.

In fact, all five are common myths and all are false! Misconceptions are common and need to be addressed in order to fully understand and appreciate these unique ecosystems.

1.2 SOUTHEAST ASIA'S MANGROVES: THE WORLD'S LARGEST AND BEST-DEVELOPED

Estimates of former worldwide extension of mangroves vary from over 15 million hectares (Lanly, in Ogino & Chihara, 1988) to 16.2 (Thurairaja, 1994) and 16.67 (Saenger *et al.*, 1983; Aksornkoae, 1993), and even as much as 19.9 million hectares (based on Groombridge, 1992). From a global perspective, Southeast Asia is well endowed as it supports the world's largest area of mangroves, originally extending over 6.8 million hectares and representing 34-42 percent of the world's total. Mangroves occur throughout Southeast Asia, from the Irrawaddy delta in Myanmar in the northwest, through the more than 17 000 scattered islands of the Indonesian and Philippine archipelagos to Papua New Guinea in the East, spanning a distance of more than 6 000 kilometres from east to west and 3 500 kilometres from north to south.

The largest areas of mangrove in Southeast Asia are found in Indonesia (almost 60 percent of Southeast Asia's total), Malaysia (11.7%), Myanmar (8.8%), Papua New Guinea (8.7%) and Thailand (5.0%; Figure 1). Detailed figures and reports on changes in mangrove area over the past decades are provided in Chapter 5.

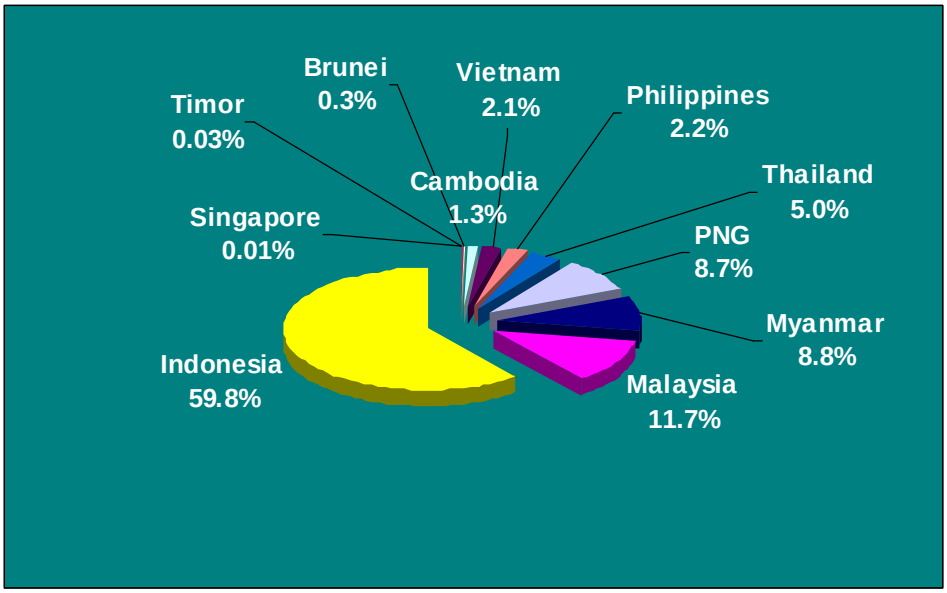


FIGURE 1
Mangrove areas in Southeast Asia

Southeast Asia's mangroves are the best developed and probably the most species-diverse in the world (Giesen & Wulffraat, 1998; chapter 2). Fifty-two Southeast Asian species are found in the mangrove habitat only and nowhere else; this group of so-called 'true mangrove species' includes 42 trees and shrubs (Annex 1). Saenger *et al.* (1983) record a world-wide total of 60 plant species exclusive to the mangrove habitat, and although the lists are not entirely identical, it is apparent that Southeast Asia has a very significant share of 'true' mangrove species.

1.3 SCOPE OF THIS GUIDEBOOK

This manual is intended to be a guide to the mangrove plants of Southeast Asia, i.e. *all* higher plants occurring in mangroves, and not only those species exclusive to this habitat. Southeast Asia was chosen as geographic scope, as this region has proven to be the world's richest in terms of biological diversity (Chapman, 1976a,b; Tomlinson, 1986; Giesen & Wulffraat, 1998). Covered – from west to east – are Myanmar, Thailand, Cambodia, Viet Nam, Malaysia, Singapore, Brunei, the Philippines, Indonesia, Timor-Leste and Papua New Guinea. The criterion for inclusion of a particular plant species in this guidebook has been that it must either be recorded as occurring in the mangrove habitat by the taxonomic reference used, or there must be at least two reliable non-taxonomic records of this species occurring in the mangrove habitat. Hybrid species are mentioned under the description of the parent species and are not treated separately.

In all, 268 species are covered (Annex 1), but more may be recognised in the future as more studies are carried out and as more taxonomic revisions become available. In terms of taxonomy, scientific names as revised by the Flora Malesiana have generally been adhered to, except where they have been superseded by Tomlinson (1986), Flora of Thailand, or revisions by the Missouri Botanical Gardens tropical botany database[1].

It is not surprising to see lists of species that include the same species recorded under various names, or incorrectly spelled names. Partly, this confusion is because of the multitude of synonyms used in taxonomic literature – some species with more than 50 synonyms – especially common but highly variable species are often endowed with many different names. To help sort out this confusion, a separate index of scientific names has been appended to guide the reader to the correct name (Annex 2).

A separate index of local names is also provided (Annex 3), but it may be noted that this is still far from complete as local names are often not recorded in taxonomic (or indeed other) literature. The authors would be grateful if readers could assist with updating this list of local names – preferably by emailing the first author.

Part one of this guidebook provides an introduction to mangroves in general, and to Southeast Asian mangroves in particular. Chapter 1 provides definitions and places Southeast Asia's mangroves in a global context, while Chapter 2 gives an account of the mangrove flora. Chapter 3 describes mangrove habitats in Southeast Asia, including information on soils, vegetation types and fauna.

[1] www.mobot.org

Chapter 4 explains about the benefits derived from mangroves, while Chapter 5 focuses on the current state of mangroves in Southeast Asia. Chapters 6 and 7 are provided for those wanting to engage in field work: six informs us where the most important areas are, while seven explains some of the basic techniques for studying mangroves.

Part two is the heart of the publication, providing the reader with keys for identification of mangrove plants, plus a 1-page data sheet and a line drawing of all mangrove plant species. Where possible, the use of specialist terms has been avoided, and those that have been used are clarified in a glossary of explanatory terms and illustrations. The mangrove plants have been ordered into seven easily recognised groups (mainly lifeforms), namely i) ferns, ii) grasses and grass-like herbs, iii) (other) ground herbs, iv) epiphytes, v) climbers, vi) palms and palm-like plants, and vii) trees and shrubs. Seven identification keys have been developed, one for each of these groups. It must be noted that some variable species can belong to more than one group – for example, *Hypserpa polyandra* (Menispermaceae) can form a shrub, but usually occurs as a large woody climber – in this case the predominant form prevails. Note that lifeforms are also listed in Annex 1.

Appended is a map showing the distribution of mangroves in Southeast Asia, kindly reproduced under licence from UNEP-WCMC (see Annex 2). This map gives an indication of the location of the most important mangrove sites in Southeast Asia. For more detailed maps, please refer to their website[2].

[2] http://www.unep-wcmc.org/index.html?http://www.unep-wcmc.org/forest/global_map.htm~main

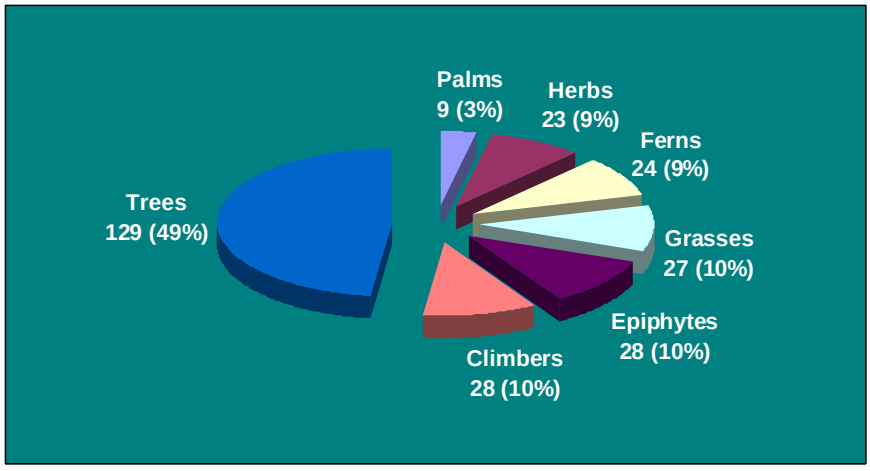
CHAPTER

2 MANGROVE FLORA

2.1 FLORA AND DIVERSITY

Southeast Asia's mangroves are the best developed and most species-diverse in the world (Giesen & Wulffraat, 1998). A total of 268 plant species have been recorded in Southeast Asian mangrove vegetation, including 129 trees and shrubs, 50 terrestrial herbs (including 27 grasses and grass-like plants), 28 climbers, 28 epiphytes, 24 ferns, seven palms, one pandan and one cycad (Annex 1; Figure 2). Of these 268 species, 52 are found in the mangrove habitat only, and this group of so-called 'true mangrove species' includes 42 trees and shrubs (Annex 1).

FIGURE 2
Species group/lifeform diversity



Note that 'trees' include shrubs; 'palms' include palm-like pandans and cycads; 'herbs' are non-grass-like terrestrial herbs; 'grasses' include grass-like sedges and bulrushes; and epiphytes do not include epiphytic ferns.

As mentioned in chapter one, Saenger *et al.* (1983) record a world-wide total of 60 plant species exclusive to the mangrove habitat, and although the lists are not entirely identical, it is apparent that Southeast Asia has a very significant share of 'true' mangrove species. The northern Indian Ocean and the north-western Pacific region (stretching from the Red Sea to Japan and Indonesia) harbours the world's most diverse mangroves. Indeed, these two regions respectively harbour 44 and 38 of the 60 'true' mangrove species listed by Saenger *et al.* (1983), while the other four regions harbour only seven (western America/eastern Pacific, eastern America/Caribbean,

western Africa) to nine (eastern Africa) true mangrove species[3]. In terms of plants, Southeast Asia's biodiversity ranks highest in the northern Indian Ocean/northwestern Pacific region, as is evident in Table 1.

TABLE 1
Species group diversity

	Southeast Asia (this publication)	NE Indian Ocean & West Pacific (Saenger *et al.*, 1983)	Australia & SW Pacific (Saenger *et al.*, 1983)
Ferns, cycads, bryophytes	25 *	35	5
Gymnosperms	1	0	0
Monocotyledons	55	73	42
Dicotyledons	187	110	80
totals	**268**	**218**	**127**

* Does not include mosses (Bryophytes)

The largest plant families recorded in Southeast Asian mangroves are the:

- Leguminosae (Fabaceae) or legumes (22 species),
- Cyperaceae or sedges (17 species),
- Rhizophoraceae – usually regarded as *the* family of mangrove trees, many with stilt roots and other adaptations (12 species), although non-mangrove species also exist (e.g. the Southeast Asian *Carallia brachiata*),
- Orchidaceae or orchids (11 species),
- Asclepiadaceae or Milk Weed family – in the mangrove habitat consisting mainly of climbers and epiphytes, all with characteristic white latex (10 species),
- Polypodiaceae or Polypody fern family – one of the main fern families world-wide (10 species),
- Poaceae or true grasses (9 species),
- Arecaceae or palms (7 species),
- Rubiaceae – the coffee family; in the mangrove habitat consisting mainly of trees and shrubs (7 species),
- Combretaceae or Terminalia family (6 species),
- Euphorbiaceae or Spurge family, with many species containing a toxic white latex (6 species),
- Loranthaceae or Mistletoe family, consisting entirely of parasitic epiphytes (6 species),
- Avicenniaceae, another family of true mangrove trees, characterised by pneumatophores, i.e. roots that emerge, peg-like, from the mangrove soil (5 species), an
- Sonneratiaceae, another family consisting predominantly of mangrove tree species (5 species).

Some of these most common families abound in species with a very wide geographic range (e.g. Cyperaceae and Poaceae) and consist largely of ubiquitous weed species.

[3] Saenger *et al.* (1983)'*s* list of 'true mangroves' (60 worldwide) is not the same as our number of 'true mangroves' (52 in Southeast Asia). The reason for this difference is that there are 11 species in Southeast Asia that are exclusive to mangroves (and therefore 'true mangrove' species), but are not recorded in Saenger's list.

Table 2 gives the distribution of all 'true' mangrove species (i.e. species found in the mangrove habitat only) in Southeast Asia. At least 48 of the 52 species listed occur in Indonesia, which is the more biodiverse of the Southeast Asian countries, followed in this respect by Malaysia, with 42 species. This supports the claim by Giesen and Wulffraat (1998) that Indonesia's mangroves are the most biodiverse in the world. Least diverse are Timor-Leste and Brunei Dar es Salaam (Figure 3), which is not surprising given the relatively small size of their territories.

This diversity appears to not only hold for angiosperms, but seems to be true for other (plant) taxons. Tanaka and Chihara (1988), for instance, in their study of macroalgae in eastern Indonesian mangroves, state that "It may be concluded that the Indonesian mangrove area is one of the most important distributional centres of macroalgae associated with mangroves in the world." Other interesting accounts of mangrove-associated algae and their diversity in the Southeast Asian region are given by Johnson (1979) and Chihara & Tanaka (1988).

TABLE 2
True mangrove species in Southeast Asia
(These species occur in the mangrove habitat only)

		Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
1	*Acanthus ebracteatus*	+	+	+	+	+	+	+	+	+		+
2	*Acanthus ilicifolius*	+	+	+	+	+	+	+	+	+	+	+
3	*Acanthus volubilis*		+	+	+	+	+		+	+		
4	*Acrostichum aureum*	+	+	+	+	+	+	+	+	+	+	+
5	*Acrostichum speciosum*	+	+	+	+	+	+	+	+	+	+	+
6	*Aegialitis annulata*			+			+				+	
7	*Aegialitis rotundifolia*		+			+				+		
8	*Aegiceras corniculatum*	+	+	+	+	+	+	+	+	+	+	+
9	*Aegiceras floridum*		+	+	+		+	+				+
10	*Amyema anisomeres*			+								
11	*Amyema gravis*			+	+							
12	*Amyema mackayense*			+								
13	*Avicennia alba*	+	+	+	+	+	+	+	+	+		+
14	*Avicennia eucalyptifolia*			+			+	+				
15	*Avicennia lanata*			+	+		+	+	+			+
16	*Avicennia marina*	+	+	+	+	+	+	+	+	+	+	+
17	*Avicennia officinalis*		+	+	+	+	+	+	+	+	+	+
18	*Brownlowia argentata*			+	+	+	+	+	+			
19	*Brownlowia tersa*	+	+	+	+	+		+	+	+		
20	*Bruguiera cylindrica*	+	+	+	+	+	+	+	+	+	+	+
21	*Bruguiera exaristata*			+			+				+	
22	*Bruguiera gymnorrhiza*	+	+	+	+	+	+	+	+	+	+	+
23	*Bruguiera hainesii*			+	+	+	+			+		
24	*Bruguiera parviflora*	+	+	+	+	+	+	+	+	+	+	+
25	*Bruguiera sexangula*	+	+	+	+	+	+	+	+	+	+	+
26	*Camptostemon philippinense*			+	?+			+				

	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
27 *Camptostemon schultzii*			+			+					
28 *Ceriops decandra*		+	+	+	+	+	+		+		+
29 *Ceriops tagal*	+	+	+	+	+	+	+	+	+	+	+
30 *Excoecaria agallocha*	+	+	+	+	+	+	+	+	+	+	+
31 *Heritiera fomes*					+						
32 *Heritiera globosa*	+		+	+							
33 *Heritiera litoralis*	+	+	+	+	+	+	+	+	+	+	+
34 *Kandelia candel*	+	+	+	+	+		+	+	+		+
35 *Lumnitzera littorea*		+	+	+	+	+	+	+			+
36 *Lumnitzera racemosa*	+	+	+	+	+	+	+	+	+	+	+
37 *Nypa fruticans*	+	+	+	+	+	+	+	+	+	+	+
38 *Osbornia octodonta*			+	+		+	+				
39 *Oberonia rhizophoreti*			+	+							
40 *Pemphis acidula*			+	+		+	+	+	+		
41 *Rhizophora apiculata*	+	+	+	+	+	+	+	+	+	+	+
42 *Rhizophora mucronata*	+	+	+	+	+	+	+	+	+	+	+
43 *Rhizophora stylosa*			+	+		+	+	+		+	+
44 *Scyphiphora hydrophyllacea*	+	+	+	+		+	+	+	+		+
45 *Sonneratia alba*	+	+	+	+	+	+	+	+	+	+	+
46 *Sonneratia apetala*					+						
47 *Sonneratia caseolaris*	+	+	+	+	+	+	+	+	+	+	+
48 *Sonneratia griffithii*		+		+	+				+		
49 *Sonneratia ovata*		+	+	+		+	+	+	+		+
50 *Xylocarpus granatum*	+	+	+	+	+	+	+	+	+	+	+
51 *Xylocarpus moluccensis*		+	+	+	+	+	+	+	+		+
52 *Xylocarpus rumphii*		+	+	+		+	+			+	
Total number of species	**25**	**34**	**48**	**42**	**34**	**40**	**38**	**33**	**33**	**24**	**31**

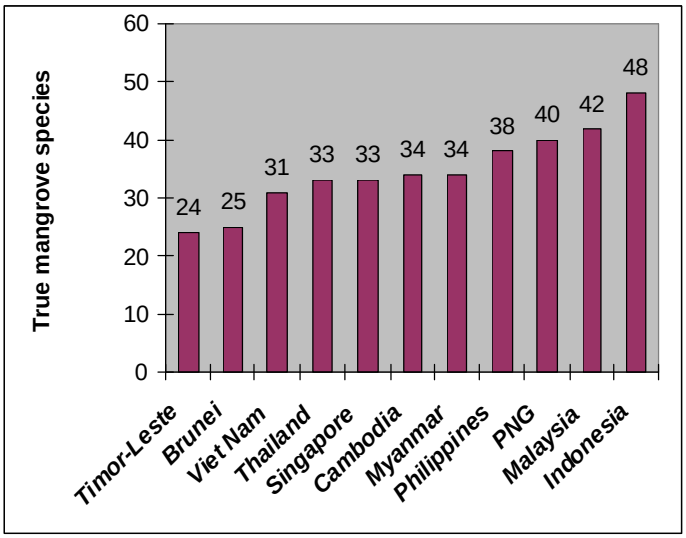


FIGURE 3
True mangrove species in Southeast Asia

2.2 ENDEMIC AND RARE/UNCOMMON PLANT SPECIES

Fifty-one species or 18 percent of the mangrove flora of Southeast Asia are endemic to the region, and includes 22 trees and shrubs, 13 epiphytes, eight ferns, four palms and four climbers (Table 3). These endemics include eight species found in the mangrove habitat only (and are therefore 'true mangroves'), including two mistletoes *Amyema anisomeres* and *A. gravis*, one orchid *Oberonia rhizophoreti*, and five trees *Aegiceras floridum, Avicennia eucalyptifolia, A. lanata, Camptostemon philippinense* and *Heritiera globosa.* Some of the Southeast Asian species are very rare, such as the epiphytic parasite *Amyema anisomeres*.

TABLE 3
Mangrove (associate) species endemic to Southeast Asia

Group	Species	Group	Species
Trees & shrubs	*Aegiceras floridum*	Ferns	*Ctenopteris moultoni*
" "	*Avicennia eucaltyptifolia*	" "	*Davallia parvula*
" "	*Avicennia lanata*	" "	*Elaphoglossum amblyphyllum*
" "	*Azima sarmentosa*	" "	*Loxogramma involuta*
" "	*Barringtonia conoidea*	" "	*Pachypleura angustata*
" "	*Blumeodendron tokbrae*	" "	*Photinopteris speciosa*
" "	*Camptostemon philippinense*	" "	*Platycerium coronarium*
" "	*Croton heterocarpus*	" "	*Selliguea heterocarpa*
" "	*Fagraea crenulata*		
" "	*Gluta velutina*	Epiphytes	*Amyema anisomeres*
" "	*Heritiera globosa*	" "	*Amyema gravis*
" "	*Ilex cymosa*	" "	*Bulbophyllum xylocarpi*
" "	*Ilex maingayi*	" "	*Cymbidium finlaysonianum*
" "	*Ixora timoriensis*	" "	*Dendrobium aloefolium*
" "	*Ochthocharis bornensis*	" "	*Dendrobium pachyphyllum*
" "	*Podocarpus polystachyus*	" "	*Dendrobium subulatum*
" "	*Quassia harmandiana*	" "	*Oberonia laeta*
" "	*Rapanea porteriana*	" "	*Oberonia rhizophoreti*
" "	*Scolopia macrophylla*	" "	*Pachycentria constricta*
" "	*Serianthes grandiflora*	" "	*Rhododendron brookeanum*
" "	*Sindora siamensis*	" "	*Schefflera lanceolata*
" "	*Symplocos celastrifolia*	" "	*Schefflera ridleyi*
Palms	*Calamus erinaceus*	Climbers	*Calycopteris floribunda*
" "	*Corypha saribus*	" "	*Combretum tetralophum*
" "	*Licuala spinosa*	" "	*Combretum trifoliatum*
" "	*Oncosperma tigillarium*	" "	*Derris scandens*

At least 35 plant species occurring in Southeast Asian mangroves are uncommon or rare:

- Twenty-one of these may be locally relatively common, but rare on the whole: *Acanthus volubilis, Aegiceras floridum, Blumeodendron tokbrae,*

Calycopteris floribunda, Cassine viburnifolia, Ceriops decandra, Croton heterocarpus, Dalbergia menoeides, Diospyros maritima, Ficus curtipes, Ilex maingayi, Oberonia laeta, Olax imbricata, Osbornia octodonta, Quassia indica, Rhizophora exaristata, Rhododendron brookeanum, Scyphiphora hydrophyllacea, Sindora siamensis, Smythea lanceata and *Sonneratia ovata*.

- Eight species are uncommon to rare in Southeast Asia, but common elsewhere (*Cyperus scariousus, Eleocharis parvula, Eleocharis spiralis, Fimbristylis sieberiana, Leptochloa neesii, Scirpus lacustris, S. litoralis, S. maritimus*). These are wide ranging, weedy sedge and grass species that do not appear to have gained a firm footing in Southeast Asia.

- The remaining six species, *Amyema anisomeres, Kandelia candel, Oberonia rhizophoreti, Quassia harmandiana, Scaevola hainanensis* and *Schefflera lanceolata* are truly rare in Southeast Asia[4]. Apart from the previously mentioned *Amyema anisomeres*, these species are generally known from a few scattered localities only. *Scaevola hainanensis*, for example, is known from only a few scattered localities in Viet Nam and Southern China, while *Quassia harmandiana* has been collected a few times only in Cambodia and Thailand. *Kandelia candel* is rare in Southeast Asia, but has become more common in Viet Nam due to planting programmes. It is also naturally common in Southern China, for example in Guangdong (Zhanjiang Mangrove National Nature Reserve) and Hong Kong (Mai Po Nature Reserve).

[4] Interestingly, *Kandelia candel* is found as far north as Japan, and is a common species in Hong Kong, being the most common Rhizophoraceae in the Mai Po marshes.

CHAPTER 3 THE MANGROVE HABITAT IN SOUTHEAST ASIA

3.1 INTRODUCTION TO THE MANGROVE HABITAT

A wonderful, unsurpassed general description of Southeast Asian mangroves is given by van Steenis (1958) – one of the fathers of plant taxonomy in Southeast Asia – in his introduction to the taxonomy of the Rhizophoraceae[5]:

> "Seen from a distance the mangrove makes the impression of a dark-green more-or-less monotonous type of forest. On entering it on foot with ebb its eerie aspect appears at once from the oppressing heat, the damp atmosphere, the bare, stinking mud, covered with stilt-rooted trees..., and several kinds of other root formations (knee-like roots, knobs, snake-like roots, erect peg- or torpedo-shaped pneumatophores), the mud teeming with crabs, fishes, shells, worms and their holes, mud-heaps and shallow pools, the air with plenty mosquitoes, the silence only interrupted now and then by the sudden rush of monkeys though the gloomy foliage, the thud of a fruit falling in the mud, or the forlorn cry of a passing seabird. For a tourist the place is singularly uninviting, but for the biologist it is a most fascinating biotope, and the secrets of its life and life conditions are certainly far from being exhausted. Entering the mangrove on board a small prahu <local canoe> during high tide..., gliding through the silent waters of the creeks, bordered now and then by the flooded forest which is nearly submerged up to the flattish underside of the tree crowns, the aspect is less fascinating and appears more monotonous, as the foliage of the trees is much alike even of representatives of very different families, all of them having dark-green, elliptic to obovate, medium-sized blades of the laurel type but rather coriaceous <leathery> and slightly fleshy. Flowers are not particularly striking, and those which are, as e.g. of *Sonneratia* and *Dolichandrone*, are nocturnal."

Van Steenis' view that mangroves are very interesting, but not the place you would go to on a picnic, is pretty much the way these habitats are seen today. Mangroves are not easy environments to work in, but they can be very rewarding. Their structure is generally straightforward and simple,

[5] Ding Hou (1958) - Rhizophoraceae. Flora Malesiana, Ser.I, 5: 429-493.

and the number of species is limited. However, the species that do occur may be very abundant, and as long-term studies show, they are often highly productive. Fortunately for the average lay person, many protected mangrove areas have now been made at least partially accessible by the construction of walkways, which help overcome at least some of the physical discomfort. For an overview of some of the main protected mangrove areas, see chapter 5.

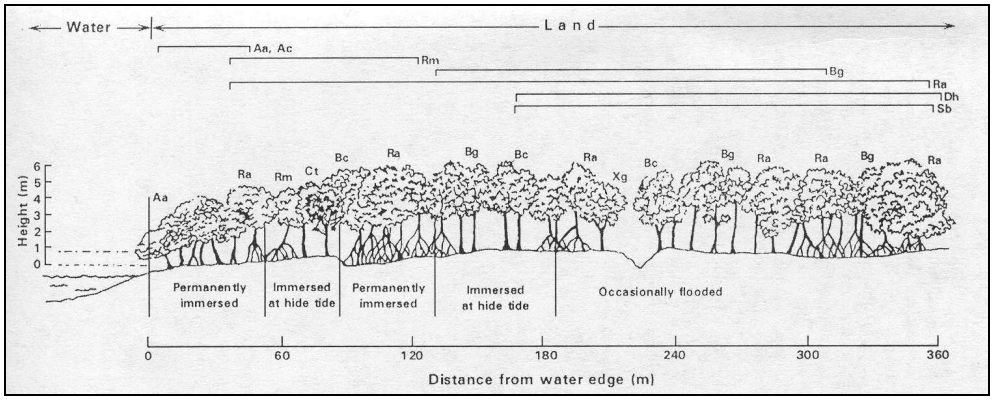
3.2 PHYSICAL CONDITIONS

Many mangrove plants have special adaptations to counteract the effects of inundation, high salinity and an unstable soil. A number possess mechanisms to actively remove salt from their tissues (e.g. leaves excreting salt), or have stilt or prop roots for support, and pneumatophores ('air roots') to assist oxygenation of root systems. Many typical mangrove tree genera, such as *Avicennia, Bruguiera, Ceriops* and *Rhizophora*, are characterized by vivipary. That is, the seeds germinate while still attached to the mother plant, and what is commonly regarded as, for example, a long *Rhizophora* 'fruit', is in fact a hypocotyl (i.e. primary stem) emerging from the fruit.

Zonation

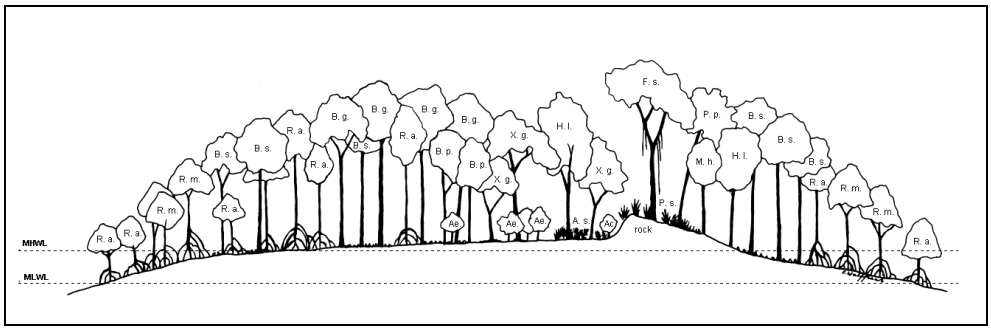
Mangrove vegetation typically displays band-like zonation patterns (e.g. Figures 4, 5), that have alternately been linked by various authors to soil type (mud, sand or peat), exposure to wave action, salinity, freshwater inflow from the hinterland and tidal influence (e.g. Watson, 1928; van Steenis, 1957; Chapman, 1976a, 1976b, 1977; Bunt & Williams, 1981; White *et al.,* 1989; Aragones *et al.,* 1998). The width of a mangrove zone rarely exceeds four kilometres, and usually it is much narrower. On eroding or steep coasts it may be scarcely 50 metres wide, while in some estuaries and sheltered, shallow bays it may be as wide as 18 kilometres (Sungai Sembilang, South Sumatra; Danielsen & Verheugt, 1990) or even 30 kilometres (Bintuni Bay, Papua; Erftemeijer *et al.*, 1989). Along tidal rivers a mangrove fringe may be found occurring upstream for many tens of kilometres, depending on saltwater intrusion. This in turn is determined by tidal amplitudes, river discharges and slopes. The last true mangrove tree species to disappear along tidal rivers is often either *Bruguiera parviflora* (van Steenis, 1957, 1958) or *Sonneratia caseolaris*, while the mangrove palm *Nypa fruticans* may occur even much further inland.

FIGURE 4A
Example of mangrove zonation in Cilacap, south coast of Java, Indonesia



Adapted from (White *et al.,* 1989).

FIGURE 4B
Schematic cross-section of a small mangrove island near Kimbe, West New Britain province, Papua New Guinea

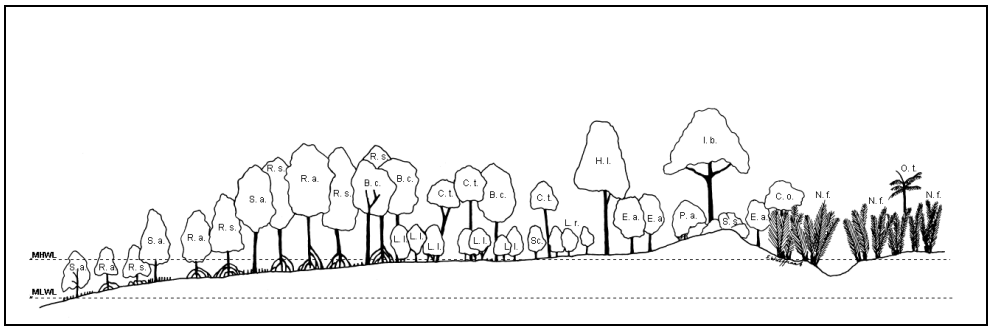


Soil substrates mainly clay, with the exception of a limestone rock in the center of the island.

Ae. - *Aegiceras corniculatum*
Ac. - *Acanthus ilicifolius*
A.s. - *Acrostichum speciosum*
B.g. - *Bruguiera gymnorrhiza*
B.p. - *Bruguiera parviflora*
B.s. - *Bruguiera sexangula*
F.s. - *Ficus* sp. (non-mangrove species)
H.l. - *Heritiera littoralis*
M.h.- *Myristica hollrungii*
P.s. - *Pandanus cf. furcatus* (non-mangrove species)
P.p. - *Pongamia pinnata*
R.a. - *Rhizophora apiculata*
R.m.- *Rhizophora mucronata*
X.g.- *Xylocarpus granatum*

MHWL - Mean High Water level; MLWL - Mean Low Water level

FIGURE 4C
Schematic cross-section of a coastal area on Bintan Island, Riau province, Indonesia



Substrates of frontal area consist of coarse sands, while inland it is mixed with loam & clay.

B.c. - *Bruguiera cylindrica*
C.b. - *Cerbera odollam*
C.t. - *Ceriops tagal*
E.a. - *Excoecaria agallocha*
H.l. - *Heritiera littoralis*
I.b. - *Intsia bijuga*
L.l. - *Lumnitzera littorea*
L.r. - *Lumnitzera racemosa*
N.f. - *Nypa fruticans*
O.t. - *Oncosperma tigillarium*
P.a. - *Pemphis acidula*
R.a. - *Rhizophora apiculata*
R.s. - *Rhizophora stylosa*
Sc. - *Scyphiphora hydrophyllacea*
S.a. - *Sonneratia alba*

Climatic conditions

The impact of climatic conditions and mangrove vegetation is not yet fully understood. Exceptions aside, mangroves are known to occur in areas where the average annual temperature is at or above approximately 18°C (Chapman, 1976a; 1977), or that has absolute temperatures above 15°C (Puff, 2001). Climatic conditions further affect mangroves, especially by influencing the salinity of the landward fringing (back- or hind-) mangroves, and by weather influence upon stream and river discharges, and affecting silt deposition along the coast. Weather conditions also affect coastal accretion or erosion, which is dealt with briefly below.

Salinity

Salinity affects mangrove composition, as various species deal with the 'salinity problem' in different ways. Some simply do not grow in waters that are too saline and are found in brackish zones only. Many species are able to selectively prevent salt absorption at the root, although this requires a good deal of expended energy. Others are able to excrete salt from their (leaf) tissues and may be covered with fine salt crystals. *Aegiceras corniculatum,* for example, has salt-excretion glands located on the leaf surface and stalk, which may be whitish and covered with salt.

Some species have a very wide range of tolerance, such as *Sonneratia caseolaris,* which may be found in pure seawater or along tidal rivers where salinity is almost that of freshwater (i.e. <0.1% seawater)[6]. The species even thrives in a freshwater pond in the Bogor Botanic Gardens in Java! Species, such as *Bruguiera* species, are generally found only where salinities are low. MacNae (1968), for example, gives 2 percent seawater as the optimum for *Bruguiera parviflora* and 1.0-2.5 percent for *Bruguiera gymnorrhiza*. Some mangrove species require high salinities, and *Rhizophora mucronata*, for instance, requires a minimum of 1.2 percent seawater for its growth, while *Aegiceras corniculatum* requires 2.0-4.0 percent seawater for optimal growth (Chapman, 1976a). Seasonality of freshwater reaching the coastal zone also affects the mangrove habitat, as in some areas salinities can fluctuate wildly according to the seasonality of rainfall in the interior.

Some plants are avoided by herbivores because of their ability to accumulate salt. Up to 11 percent dry weight of the grass *Xerochloa imberbis,* for example, may consist of salt, and it is therefore shunned by cattle.

Eroding versus accreting coastlines

Mangrove pioneers are found where sediments accumulate, and usually assist in the stabilisation of coastal sediments, though probably not very actively contributing to the accumulation of sediments (van Steenis, 1957). Mangroves occur on coastlines that are stable, rising or falling. On a rising coastline they form a fringe zone only, while on a stable coast, their extent

[6] Average seawater salinity is equivalent to about 3.4 % salt content (i.e. 34 grams/litre); 0.1 % seawater is therefore equivalent to 0.0034 % salt content or 0.34 grams/litre.

depends on the slope. On a subsiding coast mangroves tend to be extensive to very extensive (Chapman, 1976b).

Mangroves on an eroding coastline have often developed during an earlier period, when the coastline was still stable. A first pioneer zone is often lacking or degrading, and the seaward fringe often consists of a *Rhizophora*-dominated zone, which is usually the second zone on a stable coastline.

Substrates

Most mangrove species do best on muddy soils, i.e. in areas where silt accumulates (Watson, 1928; van Steenis, 1957; Chapman, 1976a, 1977; Aragones *et al.*, 1998), and typical for muddy substrates in Southeast Asia are the well-developed stands of *Rhizophora mucronata* and *Avicennia marina* (Watson, 1928; Kint, 1934; van Steenis, 1958). Tall stands of *Bruguiera* dominated forests are often found on deep muddy soils.

Certain species such as *Rhizophora stylosa* also do well on sands, and even on coral islands which have a substrate consisting of coral debris, shells and *Halimeda* (calcareous seaweed) fragments (Ding Hou, 1958). Kint (1934) reports that in Indonesia, *Rhizophora stylosa* and *Sonneratia alba* typically occur on sandy, and even rocky shores. Aragones *et al.* (1998) report that in the Philippines *Rhizophora, Bruguiera, Sonneratia* and *Ceriops* do well on coral beaches and areas along or close to channels, while *Sonneratia* are more common in open bays, and *Xylocarpus, Lumnitzera* and *Aegiceras* do well along inner, landward margins. Stands of *Lumnitzera littorea* are common on this kind of sites on islands of the Riau archipelago in Indonesia.

On certain subsiding coasts mangroves may develop on peat soils (e.g. Florida, USA; Chapman, 1976a), and in Indonesia such habitats occur in South Sulawesi, Indonesia (northern Bone Bay and the Lariang-Lumu plains; Giesen *et al.*, 1991). In the Lariang-Lumu area, for example, exceptionally well developed *Rhizophora-Bruguiera* mangroves were found on deep peat (>3 m deep) overlain with a shallow (0.5 m) layer of sand. Mangrove soils with a high content of organic matter (62%) have also been reported from the Thousand Islands group, off Jakarta Bay, Indonesia (Hardjowigeno, 1989).

Another typical feature of soils of mangrove areas is the development of iron pyrites (FeS_2) in the soil. This typically occurs in estuaries because of the presence of iron (scarce in seawater, but abundant in river water), sulphates (in seawater) and organic matter, and a lack of oxygen in the soil. These soils form 'Potential Acid Sulphate' soils, which upon development and exposure to air may turn highly acidic due to the reaction of iron pyrites with oxygen, resulting in the production of sulphuric acid (Dent, 1986; Craswell & Pushparajah, 1989; Hardjowigeno, 1989; Konsten & Klepper, 1992). Mobilisation of toxic aluminium ions due to a lowering of the pH seems to be one of the major problems associated with these soils (Dent, 1986).

Tides

Mangrove vegetation zones are clearly linked with tides, and various authors report of a good correlation with either tidal amplitude or frequency of flooding (Watson, 1928; de Haan, 1931; van Steenis, 1958; Chapman, 1976a). In Southeast Asia, areas that are flooded during all high tides tend to be dominated by *Avicennia alba, A. marina* or *Sonneratia alba*, while areas that are flooded by most high tides are dominated by *Rhizophora* species. Mangroves flooded by normal high tides are dominated by *Bruguiera* species, with *Xylocarpus granatum* on the landward fringe. Areas inundated by spring tides only, i.e. for only a few days per month, are dominated by *Bruguiera sexangula, Heritiera* species and *Lumnitzera littorea*. Boundaries of vegetation zones therefore often coincide with tidal isohyets (contours). For instance, the seaward facing zone is usually located between the lowest low water level and the mean low water level, above which the second zone often begins (for example, see Figures 4b & 4c).

3.3 MANGROVE VEGETATION TYPES

Structure

Mangroves in Southeast Asia may range from 1-2 metre tall *Avicennia alba* or *Avicenia marina* stands on the seaward side of accreting shores, to 30-40 metre tall stands of mixed *Bruguiera-Rhizophora* mangrove forest. On more exposed but not eroding coastlines one may find *Sonneratia alba* and *Avicennia alba*, and along waters of lower salinity (e.g. in estuaries) *Nypa fruticans, Cerbera odollam* and *Sonneratia caseolaris* are common. Apart from saplings, undergrowth is often scarce but certainly not absent, and species such as sea holly *Acanthus ilicifolius* and mangrove fern, *Acrostichum aureum* may be common along banks of creeks and in disturbed areas.

In clear tidal creeks of Peninsular Malaysia, Viet Nam, Thailand, western Indonesia and Papua New Guinea one may find the ornamental aroid *Cryptocoryne ciliata,* while *Najas* species and *Ruppia maritima* have been recorded in small mangrove pools. Climbers are relatively common, especially on the landward fringes of mangroves. Epiphytes, such as orchids, ferns and mistletoes are common in older, well-developed mangroves, but may be scarce or absent in younger mangrove stands such as regenerating, logged-over forests.

Mangroves typically display zonation, and when viewed from the air or from an observation tower the bands of different vegetation types can easily be discerned. The cause of this zonation has been attributed to salinity, elevation and exposure to wave action. The general consensus, however, is that these patterns are determined by a combination of these factors, but that tidal inundation is the dominating factor (e.g. Watson, 1928; Kint, 1934; van Steenis, 1958; Chapman, 1976a; Aksornkoae, 1993).

Mangroves are dynamic habitats, with rapid changes (e.g. local die-off) followed by rapid regrowth (Jiménez & Lugo, 1985). Changes may be either

cyclic (Jiménez & Lugo, 1985) or successional (Carter, 1959; Chapman, 1976, 1977), but whatever process may be occurring, the net result is the formation of distinct zones or bands of different vegetation types. Rapid colonisation of newly formed mudflats is a common process along expanding coastlines, such as in the estuaries of large rivers.

Five main mangrove zones

In their simplest form, Southeast Asian mangroves generally occur in five zones:

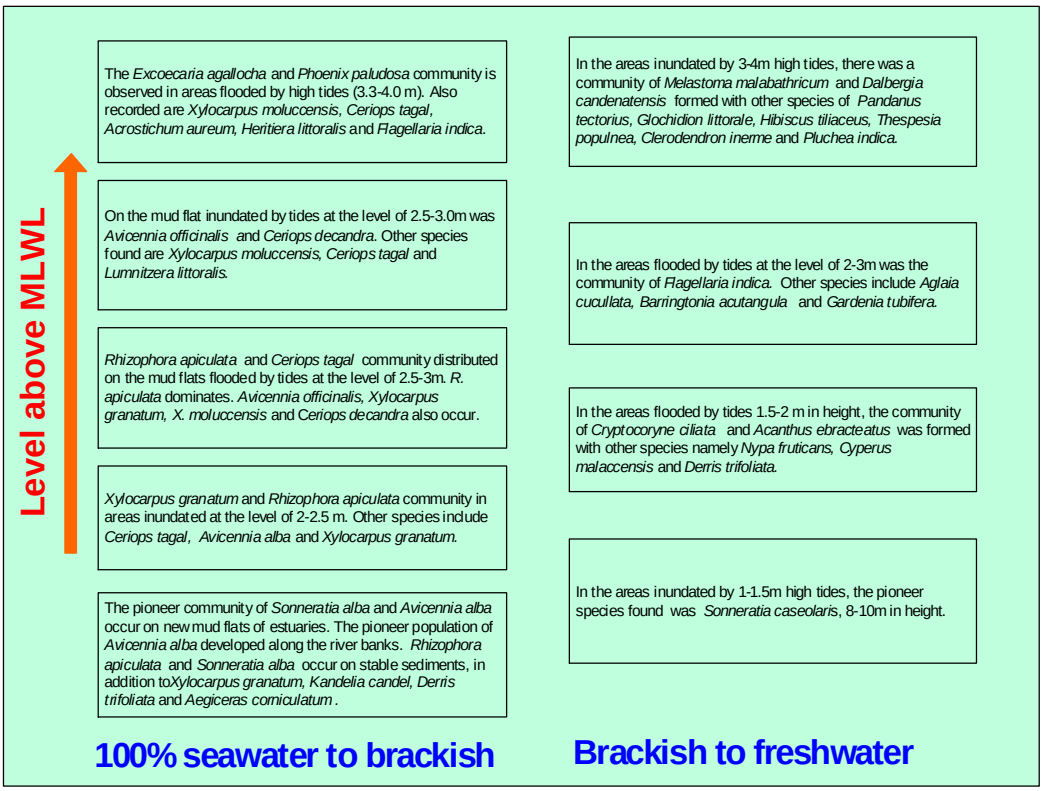
- one on the highly exposed seaward side that is inundated during all high tides;
- one on less dynamic, exposed, seaward sides, inundated by all high tides;
- a central, well-developed mangrove inundated by normal high tides;
- a landward/freshwater-influenced zone (the back-, hind- or rear-mangrove) inundated by spring tides, and
- a zone occurring along brackish to almost fresh streams and/or occasionally inundated by exceptionally high tides.

Hong (2000) recognises a combination of salinity and tidal regime (see Figure 5), which nicely illustrates the interaction between these two factors. However, such combined systems seem to have only a local relevance, as there is much variation throughout the region, and for the sake of simplicity the five zone system recognised by Watson (1928), van Steenis (1958), Chapman (1975) and Aksornkoae (1993) is probably the best point of departure. These zones are described in some detail below, while Table 4 provides a list of species recorded in these zones per country – this is not exhaustive, but based on a number of key references only.

Zone 1) - highly exposed mangrove, occurring on the seaward side of mangrove belts and inundated by all high tides. According to Watson (1928), van Steenis (1958) and Aksornkoae (1993), this type of habitat is devoid of all species except for *Rhizophora mucronata,* and even this species requires that its crown remains above water. This zone is not always present.

Zone 2) - exposed mangrove, occurring on the seaward side of mangrove belts and inundated by medium high tides. According to van Steenis (1958), this is the zone of the *Sonneratias* and *Avicennias*, and most commonly *Sonneratia alba* and *Avicennia alba* co-dominate in this deeply inundated coastal zone. With some minor variation, this observation is supported by most authors reporting on Southeast Asian mangroves, and similar observations have been made by Watson (1928) in Peninsular Malaysia, Percival and Womersley (1975) in Papua New Guinea (where *Avicennia marina* replaces *A. alba* as the most common *Avicennia* in this habitat), Aragones *et al.* (1998) in the Philippines and Hong (2000) in Viet Nam. Often one of the two genera may dominate. Komiyama *et al.* (1988),

FIGURE 5
Mangrove communities in Viet Nam: relationship with inundation and salinity



Source: adapted from Hong (2000), who developed this system based on Can Gio mangroves in Viet Nam's Mekong Delta. MLWL = Mean Low Water Level.

who found in Halmahera (Moluccas, Indonesia) that this zone was dominated by *Sonneratia alba*, and in Karang Agung (South Sumatra, Indonesia), Samingan (1980) found that this zone was dominated by *Avincennia alba*, which occurred in almost pure stands in a belt along the coast in areas under heavy influence of the sea.

The floristic composition of this more exposed community also depend on substrate, as *Sonneratia alba* tends to dominate on sands, or on corals, as on the islands in the Handeuleum bay of Ujung Kulon (West Java, Indonesia), while according to van Steenis (1958) *Avicennia marina* and *Rhizophora mucronata* tend to dominate on muddier shores. According to Kantor Menteri Negara Lingkungan Hidup (1993), however, *Sonneratia* is associated with the ubiquitous *Avicennia* if the muddy soils are rich in organic matter. On muddy shores on the north coast of West Java, this zone consists mainly of *Avicennia marina* and *A. alba*.

Zone 3) - central mangroves are usually dominated by *Rhizophora* species but in the Karang Agung area (South Sumatra, Indonesia), Samingan (1980) found it to be dominated by *Bruguiera cylindrica* (his *B. caryophylloides*). Other important species he found in this zone in Karang Agung include *Bruguiera sexangula* (his *B. eriopetala*), *B. gymnorrhiza, Rhizophora mucronata, Xylocarpus granatum* and *X. moluccensis*. In mangroves on the north coast of New Britain (PNG), this zone was found to be dominated by tall *Bruguiera*

gymnorrhiza, B. sexangula and *Rhizophora apiculata* trees, together with *Bruguiera parviflora* and *Xylocarpus granatum* of somewhat shorter stature. Older *Bruguiera* trees were found to be particularly rich in epiphytes.

Many forms and types van been described in Southeast Asia by various authors (e.g. Watson, 1928; Kartawinata & Walujo, 1977; Kartawinata *et al.*, 1979; Komiyama *et al.* 1988; Mirmanto *et al.*, 1989; Abdulhadi & Suhardjono, 1994, Aragones *et al.*, 1998), and include many combinations of the true mangrove species described in this publication.

This zone can often be sub-divided into a more seaward facing zone dominated by *Rhizophora* species and a more landward facing zone dominated by *Bruguiera* species, frequently with a lower storey of *Ceriops*. The *Rhizophora* zone is then often considered a second pioneer zone, while the *Bruguiera* zone is considered the real climax zone. However, because of the high degree of dynamics of mangroves, some authors tend to regard all mangroves as pioneer vegetation.

Zone 4) - rear mangrove (or hind-mangrove, back mangrove, landward mangrove) occurs in the landward zone behind true mangrove belts, and are inundated by the highest tides only. This does not automatically mean that this zone is less saline than the other mangrove zones, as this depends upon climatic conditions and the shape of the terrain. In a monsoonal climate, this zone can even become hypersaline, as during the dry season, part of the seawater entering the zone during spring tides evaporates, leaving behind salt deposits that are not washed away until the next spring tide several weeks later. In more humid parts of Southeast Asia, however, this zone may be almost freshwater throughout a greater part of the year. Species commonly found in this zone include *Excoecaria agallocha, Ficus microcarpa (*often wrongly recorded as *Ficus retusa), Intsia bijuga, Nypa fruticans, Lumnitzera racemosa, Pandanus tectorius* and *Xylocarpus moluccensis* (Kantor Menteri Negara Lingkungan Hidup, 1993). On Pulau Rambut, West Java, *Heritiera littoralis* and *Xylocarpus moluccensis* are very common in this zone, but on coral islands in Ujung Kulon, West Java, this zone is dominated by *Lumnitzera littorea*. This is the most species-rich zone, and probably almost three-quarters of all species listed in this field guide are found in this zone at one time or another.

Zone 5) - brackish stream mangroves, found along brackish to almost freshwater streams, are usually dominated by *Nypa* or *Sonneratia* communities. Samingan (1980) found in the Karang Agung area in South Sumatra that the *Nypa fruticans* community occurred in narrow belts along most streams. These belts often consisted of pure stands of *Nypa fruticans*, but was backed by vegetation that included *Cerbera* species, *Gluta velutina, Stenochlaena palustris* and *Xylocarpus granatum*. Closer to the coast Samingan found that a mixed *Sonneratia-Nypa* community often occurred. In many areas, however, *Sonneratia caseolaris* may be dominant, especially in almost freshwater parts of the estuaries, for example on Pulau Kaget and Pulau Kembang in the estuary of the Barito river (South Kalimantan, Indonesia),

in the mouth of the Singkil river in Southwest Aceh (Sumatra, Indonesia; Giesen & van Balen, 1991), or on newly formed sedimentation islands in the mouth of the Cisadane River in Banten, West Java.

Sonneratia caseolaris is almost absent along tidal creeks in Way Kambas National Park (Lampung, Indonesia), where the dominant species is in most places *Nypa fruticans*, with many *Cerbera odollam* and *Dolichandrone spathacea* trees. Brackish stream mangroves can also occur in wider areas, such as brackish water marshes, where *Nypa fruticans* is generally (very) dominant, covering up to 90 percent of the area. This is for instance the case in most of the estuaries of the large rivers of eastern Borneo (East Kalimantan and Sabah). In South Sumatra, *Oncosperma tigillarium* is the dominant species of the landward fringe of these brackish water swamps.

Within the exposed and central mangroves one can also recognize zonation of other taxons. Macroalgae associated with Southeast Asian mangroves, for instance, show a clear zonation linked with tidal exposure. *Rhizoclonium* species occur in the upper intertidal zone, *Bostrychia* species in the upper to middle intertidal zones, *Caloglossum* species in the middle intertidal zone and *Catanella, Caldophora* and *Geledium* species in the lower intertidal (Chihara & Tanaka, 1988).

One must be careful not to oversimplify, however, as many forms and overlapping vegetation types/zones occur, and structures/correlations found in one area are often not directly applicable to other areas. As mentioned above, the structure of individual stands may vary from 30+ metre-tall *Rhizophora-Bruguiera* forest to dwarfish stands of 1-2 metre-tall *Avicennia*. Some authors (e.g. Janzen, 1985) have oversimplified the structure concept and concluded that mangroves totally lack an understorey and climbers. Janzen is supported by some, including Corlett (1986), who gives examples of mangrove vines and shrubs, but goes on to conclude that "most mangrove forests do lack an understory and vines". Southeast Asian mangroves include at least 43 shrub species, 28 climbers and 53 terrestrial herb species, of which many occur exclusively in the 'true mangrove environment'. In terms of area, vines and shrubs cover very little, but they appear as important elements along streams, on exposed, open patches in mangrove forest, and thinly scattered through the well-developed forest.

Mangrove vegetation is one of the two main types of coastal forest in Southeast Asia. The other type is Beach Forest, which in Southeast Asia is usually identical with the "*Barringtonia* formation" (e.g. van Steenis, 1958) or *Barringtonia asiatica-Terminalia catappa* vegetation. Beach forest generally occurs along exposed, sandy or coral coasts. Unlike mangroves, they are almost never inundated by seawater, but root in freshwater, although evidently influenced by the sea. Many typical beach forest species such as *Barringtonia* species, *Pemphis acidula, Terminalia catappa, Calophyllum inophyllum* and *Thespesia populnea* can often be found in the landward fringe of mangroves as well.

3.4 MANGROVE FAUNA

Mangroves provide food, shelter and a home for many animal species, which in some ways are not markedly different from terrestrial environments, and in other ways are totally different.

Molluscs

Molluscs are abundant in Southeast Asia's mangroves and Budiman (1985), for instance, has described a total of 91 species from one site in Ceram (in the Moluccas, Indonesia) alone. This included 33 species that normally occur on a reef flat, but also 'visit' adjacent mangroves. Some of these 91 species occur as infauna (in the soil), others are ground dwellers, while the remainder occur on the vegetation. The latter consist of sessile (mainly bivalves) and mobile species, some of which migrate up and down with the tidal movement (Chen, 1982). Other sites may not be quite as rich as the Ceram site: Giesen *et al.* (1991) recorded 74 mollusc species in mangroves of South Sulawesi (Indonesia), while Budiman (1988) found 40 species in Halmahera (Moluccas, Indonesia). A large proportion of the mollusc fauna found in mangroves may be confined to this habitat; 24 out of the 40 species found at Halmahera by Budiman (1988), for instance, are specific mangrove species.

Some of the most common gastropod species include the telescope snail *Telescopium telescopium,* mudcreeper *Terebralia palustris,* zoned horn shell *Batillaria zonalis* and the obtuse horn shell *Cerithidea obtusa.* Common mangrove bivalves include the toothless lucina *Anodontia edentula,* sunset siliqua *Siliqua radiata* and the gaudy asaphis *Asaphis deflorata* (Tucker Abott, 1991).

Crabs

Crabs are particularly abundant in mangroves, and densities of 10-70 individuals per square metres can be found (Macintosh, 1984), especially of burrowing species of the genera *Cleistocoeloma, Macrophthalmus, Metaplax, Ilyoplax, Sesarma* and *Uca* (Calling- or Fiddler Crabs) (Tweedie & Harrison, 1954; MacNae, 1968; Macintosh, 1984; Wada & Wowor, 1989; Sasekumar *et al.*, 1989). Special mention should be made of the Mangrove Crab (or Asiatic Edible Crab), *Scylla serrata*, which is an important commercial species and appears confined to this habitat (Delsman, 1927). Many crab fattening industries in Southeast Asia are based on this species. More than 100 brachyuran mangrove crabs are known from Malaysia, and 76 species are known from Singapore; in the latter this represents 22 percent of the total brachyuran fauna for the island state (Tan & Ng, 1994). Indonesia's crab fauna has been studied in less detail, and the records are patchy.

TABLE 4
Mangrove zones and species in Southeast Asian countries (note: this is an example only, and not an exhaustive list)

	Cambodia	Indonesia	Malaysia	PNG	Philippines	Thailand	Timor-Leste	Viet Nam
Zone 1: Highly exposed mangrove								
Rhizophora mucronata		+	+			+		
Zone 2: Exposed mangroves								
Avicennia alba	+	+	+	+	+	+		+
Avicennia marina		+		+	+		+	
Sonneratia alba		+	+	+	+	+	+	+
Rhizophora mucronata		+	+		+	+		
Zone 3: Central mangroves								
Acanthus ilicifolius	+	+	+					
Acrostichum aureum	+							
Aegiceras corniculatum	+	+			+		+	
Avicennia marina		+		+			+	
Avicennia officinalis								+
Bruguiera cylindrica		+	+		+			
Bruguiera gymnorrhiza	+	+	+	+	+			
Bruguiera parviflora		+	+	+	+		+	
Bruguiera sexangula	+	+	+					
Ceriops decandra	+	+		+	+	+		+
Ceriops tagal	+	+	+		+			+
Derris trifoliata								+
Excoecaria agallocha	+	+			+	+		
Kandelia candel								+
Lumnitzera littorea		+	+		+	+		+
Lumnitzera racemosa	+	+			+	+	+	
Rhizophora apiculata		+		+		+	+	+
Rhizophora mucronata	+	+	+	+				
Sonneratia alba	+	+	+	+			+	+
Xylocarpus granatum	+	+	+			+		+
Xylocarpus moluccensis		+	+					+
Zone 4: Rear mangroves								
Acrostichum aureum	+	+					+	+
Aglaia cucullata	+			+		+		+
Barringtonia acutangula		+						+
Bruguiera gymnorrhiza		+		+		+		
Bruguiera sexangula		+	+					
Calophyllum inophyllum	+	+		+				
Camptostemon schultzii				+				
Cycas rumphii							+	
Clerodendrum inerme		+						+
Dalbergia candenatensis								+
Dolichandrone spathacea				+			+	
Excoecaria agallocha		+		+	+	+		+
Ficus microcarpa		+						

	Cambodia	Indonesia	Malaysia	PNG	Philippines	Thailand	Timor-Leste	Viet Nam
Zone 4: Rear mangroves (ctd.)								
Flagellaria indica								+
Gardenia tubifera								+
Glochidion littorale	+							+
Heritiera littoralis	+	+		+	+			+
Hibiscus tiliaceus								+
Intsia bijuga		+		+				
Lumnitzera littorea		+		+				+
Lumnitzera racemosa	+	+		+				
Melaleuca cajututi	+						+	
Melastoma malabathricum								+
Myristica hollrungii				+				
Nypa fruticans		+		+				
Pandanus tectorius		+					+	+
Phoenix paludosa	+							+
Pluchea indica	+	+	+					+
Rhizophora apiculata				+				
Thespesia populnea								+
Xylocarpus granatum		+	+	+	+	+	+	
Xylocarpus moluccensis		+	+	+	+			+
Zone 5: Brackish stream & rarely inundated mangroves								
Acanthus ebracteatus	+							+
Acanthus ilicifolius	+	+						
Barringtonia acutangula	+	+						+
Bruguiera gymnorrhiza	+	+	+					
Cerbera manghas		+						
Cerbera odollam		+						
Cryptocoryne cilitata		+						+
Derris trifoliata		+						+
Dolichandrone spathacea		+						
Gluta velutina		+						
Nypa fruticans	+	+	+	+	+	+	+	+
Oncosperma tigillarium		+	+					
Sonneratia caseolaris	+	+	+					+
Stenochlaena palustris		+						
Xylocarpus granatum		+	+					
Xylocarpys moluccensis		+	+					

Sources: Cambodia (Smith, 2001), Timor-Leste (www.uc.pt/timor/florafauna.html), Indonesia (van Steenis, 1958), Malaysia (Watson, 1928), PNG (Percial & Womersley, 1975), Philippines (Aragones *et al.*, 1998), Thailand (Aksornkoae, 1993), Viet Nam (Hong, 2000).

Giesen, *et al.* (1991) recorded a total of 28 crab species in mangroves of South Sulawesi, and as often is the case, the dominant genera are *Sesarma* and *Uca.* Wada (1988) gives some useful observations on mangrove crab behaviour and the different assemblages associated with various mangrove habitats. The two most common species found by Adiwiryono *et al.* (1984) in South Sumatra were mud lobster *Thalassina anomala* and the fiddler crab *Uca dussumieri*. The numerous mounds seen in mangroves are made by the mud lobster, while the holes themselves are often inhabited by *Sesarma* crabs, which are actually the second 'tenants' (Tweedie & Harrison, 1954).

Other crustaceans

Mangroves are an important habitat for many other crustaceans, and it should be noted that they form a very important breeding and nursery area for commercially important shrimp species. Sasekumar *et al.* (1992) recorded nine species of prawns in the mangrove creeks and inlets of Selangor State, Peninsular Malaysia, the majority of which were present there as juveniles. Giesen *et al.* (1991) record 14 prawn species in mangroves of South Sulawesi, including *Macrobrachium* (8 species), *Metapeneus* (2 species) and *Palaemonetes* (2 species). Toro (1979; quoted by Manuputty, 1984) recorded 28 crustacean species, including eight prawn species, in the mangroves of Pari Island, one of the Thousand Islands, off Jakarta Bay. Adiwiryono *et al.* (1984) found an even higher crustacean diversity - 34 species - in mangroves of Tanjung Bungin (South Sumatra, Indonesia).

Other arthropods

Arboreal mangrove arthropods, including insects, are described for Halmahera (Moluccas, Indonesia) by Abe (1988), and the most common orders were found to be Hymenoptera, Diptera and Psocoptera (all of which are insects). Even to the casual visitor it is obvious that mangroves are great habitats for mosquitoes – although humans may make great meals the most obvious prey of adult mosquitoes in most mangroves are birds and amphibians.

Mosquitoe attacks are not restricted to any particular group of organisms, and MacNae (1968) reported that he once observed mosquitoes biting the heads of mudskippers. During their aquatic larval life cycle, mosquitoe larvae may make a significant contribution to the benthic food chain, and various marine organisms (esp. fish) feed on them. Among the most common mosquitoes in Southeast Asia is the *Anopheles (Myzomyia) sundaicus*, which is apparently restricted to the western regions of the Indonesian Archipelago, where it is responsible for most cases of malaria (MacNae, 1968). According to MacNae (1968), *Aedes amesii* is the most common mosquito in mangroves from Malaysia and Sumatra to the Philippines and Thailand. In Sulawesi alone, there are about 125 species of mosquitoes in all (only some of which are mangrove species), but only four genera act as vectors for debilitating diseases such as malaria (*Anopheles* and *Culex*), dengue fever (*Aedes*) and filariasis (*Mansonia* and *Culex*) (Whitten *et al.*, 1988). Species commonly associated with mangroves in Southeast Asia are *Aedes alternans, A. amesii, A. butleri, A. fumidus, A.*

littoreus, A. niveus, A. pembaensis, A. scutellaris, A. vigilax, Anopheles amictus, A. barbirostris, A. farauti, A. subpictus, A. sundaicus and *Culex sitiens*. It might be possible to strongly reduce the abundance of mosquitoes in mangroves by ensuring that no stagnant pools remain during low tides. This could be a consideration when aiming to retain mangroves in the vicinity of urban areas.

Fish

Mangroves are highly important breeding and nursery habitats for many fish species, including many commercial fish species. Sasekumar *et al.* (1992) recorded 119 fish species in mangrove creeks and inlets of Selangor State, Peninsular Malaysia, the majority of which were present as juveniles. Conspicuous at low tide are the many species of mudskipper (*Periopthalmus* species, *Scartelaos* species; MacNae, 1968) that occur in pools or perched on the lower stems of mangrove plants, ready to leap if danger should arise. In Indonesia, Burhanuddin (1993) recorded 62 fish species in mangroves of Ujung Kulon-Pulau Penaitan National Park. In both areas, the dominant species is the herbivorous *Mugil cephalus*, while other common species include the carnivorous *Caranx kalla, Holocentrum rubrum, Lutjanus fulviflamma* and *Plotosus canius*, and the insectivorous *Toxotes jaculator* (the famous 'archer fish').

Amphibians & reptiles

Few amphibians can survive the saline mangrove environment, but two species of frog are nevertheless fairly common, especialy in the rear mangrove areas: the mangrove frog *Fejervarya cancrivora* and the grass frog *Fejervarya limnocharis* (formerly known as *Rana cancrivora* and *Rana limnocharis;* MacNae, 1968; Inger & Stuebing, 1997; Iskandar, 1998). *Fejervarya cancrivora* owes its scientific name (and one of its common names) to its habit of devouring small crabs. The common toad *Bufo melanostichus* may also be found upon occasion, especially on landward margins, and in Viet Nam tree frogs *Racophorus lecuomystax* are regularly recorded (Hong, 2004).

Reptiles commonly occurring in Southeast Asian mangroves are the estuarine crocodile *Crocodylus porosus*, water monitor *Varanus salvator*, rainbow water-snake *Enhydris enhydris*, crab-eating water snake *Fordonia leucobalia*, mangrove snake *Boiga dendrophila*, marine file snake *Acrochordus granulosus*, dog-faced water snake *Cerberus rhynchops*, Wagler's pit viper *Trimeresurus wagleri* and the shore pit viper *Trimeresurus purpureomaculatus* (MacNae, 1968; Keng & Tat-Mong, 1989; Stuebing & Inger, 1999). The dog-faced water snake is a common species of mangrove mudflats, where it feeds mainly on mudskippers (Giesen, 1993). None of these species are exclusive, as most are also found in adjacent freshwater or dryland environments.

Birds

Birds occurring in mangroves may be quite similar to those of adjacent dryland forest. Van Balen (1989) reports that of the 167 bird species

recorded in mangroves of Java, six are confined to mangroves while a further three are characteristic for this habitat. Other groups make use of mangroves, for example as roosts on a daily basis (mainly waterbirds; for example on Pulau Dua and Pulau Rambut, West Java), daily foraging (includes a number of pigeons) and as a seasonal stop-over site on migrations (e.g. a number of waterbirds, and insectivorous birds). The majority of the species, however, are found both in adjacent rain forests, rural and urban areas. The Indonesian Wetland Data Base (operated by Wetlands International-Indonesia Programme) lists a total of more than 200 bird species occurring in mangrove habitats, which is about 13 percent of the (very rich) Indonesian avifauna (1 532 species; Andrew, 1992). Mangroves play an important role for migratory waterbirds, mainly as roosting sites during high tide, but also as places of shelter and foraging.

The total number of bird species found at any one site are of course much lower. In the Sungai Merbok mangroves of Kedah, Malaysia, Noske (1993; cites in Wetlands International-Asia Pacific, 1996) recorded a total of 48 species. On a slightly greater scale (Kedah State mangroves, with 8,000 hectaresof mangrove; AWB, 1995), Gregory-Smith (1993) recorded 78 bird species in this habitat, of which 73 fed in the mangrove, 48 were regular or occasional resident species, 15 were mainly mangrove dependent, and 12 roosted in the mangrove. The mainly mangrove depedent species include striated heron *Butorides striatus*, masked finfoot *Heliopais personata*, common kingfisher *Alcedo atthis*, brown-winged kingfisher *Pelargopsis amauropterus*, ruddy kingfisher *Halcyon coromanda*, collared or mangrove kingfisher *Todirhamphus (Halcyon) chloris*, mangrove pitta *Pitta megarhyncha,* ashy drongo *Dicrurus leucophaeus*, golden-bellied gerygone *Gerygone sulphurea*, ashy tailorbird *Orthotomus ruficeps*, mangrove blue-flycatcher *Cyornis rufigastra*, pied fantail *Rhipidura javanica*, mangrove whistler *Pachycephala grisola*, plain-throated sunbird *Anthreptes malacensis* and copper-throated sunbird *Nectarinia calcostetha* (Gregory-Smith, 1993).

Particularly important to migratory waterbirds are the mangroves along the Irrawaddy delta, Myanmar (Scott, 1989; Maung, 2003), the Mekong delta (Scott, 1989; Hong & San, 1993), west coast of Peninsular Malaysia (Scott, 1989), eastern coast of Sumatra (Silvius, 1986; Silvius, Verheugt & Iskandar, 1986; Danielsen & Verheugt, 1989; Giesen, 1991;), the north coast of Java (Erftemeijer & Djuharsa, 1988) and the western coast of South Sulawesi (Baltzer, 1990; Giesen *et al.*, 1991).

East Sumatra's mangrove coasts have been found to seasonally harbour more than 90 percent of the world population of milky stork *Mycteria cinerea* (listed as Vulnerable by IUCN), which does not occur in large numbers elsewhere (<200 in Malaysia). The north coast of Java and the east coast of Sumatra supports about 90 percent of the world population of (IUCN listed) Near-threatened Asian dowitcher *Limnodromus semipalmatus* during migration (Silvius, pers. comm. December 2004).

Mammals

Mammals commonly found in Southeast Asia's mangroves include wild boar *Sus scrofa*, sambar *Cervus unicolor*, hog deer *Cervus porcinus*, mouse deer *Tragulus*

javanicus, barking deer *Muntiacus muntjak*, tapir *Tapirus malayanus*, flying foxes *Pteropus* species (e.g. roosting colony on Pulau Rambut, Jakarta Bay), otters (*Lutra perspicillata* and *Aonyx cinerea*), silvered leaf monkeys *Trachypithecus aurata* (commonly known as *Presbytis cristata*), and proboscis monkey *Nasalis larvatus* (endemic to Borneo; MacNae, 1968; Payne, Francis & Phillipps, 1985; Melisch *et al.*, 1993).

None of these are exclusive to mangroves: although it was formerly thought that proboscis monkey were only found in mangroves (MacNae, 1968), it is now well known that this species also occurs in Kalimantan's (peat-) swamp and riparian forests (e.g. Payne, Francis & Phillipps, 1985). Long-tailed (or crab-eating) macaques *Macaca fascicularis* are common in mangroves throughout their range (Viet Nam and Burma, to Sumatra, Java and Kalimantan)[7], and are often seen foraging on the mudflats between mangroves and along creeks at low tide (Giesen, 1991a, 1991b). *Macaca ochreata ochreata* (one of the leaf monkeys endemic to Sulawesi) was observed to be common in mangroves near Malili, in Bone Nay, South Sulawesi (Giesen *et al.*, 1991).

More rarely, one may also encounter the rare fish-eating cat *Felis viverrina*, elephant *Elephas maximus,* pather *Panthera pardus* or tiger *Panthera tigris*. Curiously, squirrels are rarely seen in mangroves, although Southeast Asia has an extemely rich squirrel fauna.

Wild elephant are found scattered in small numbers in Southeast Asia, including in Myanmar, Cambodia, Thailand, Viet Nam, Malaysia (Peninsular and Sabah) and Indonesia (Sumatra). Upon occasion they may also be found in mangroves – during dry summer months in Myanmar, for example, elephants come down from the mountains to the mangroves to drink salt water.[8]

Tigers are found in small numbers and widely scattered in Myanmar, Thailand, Cambodia, Malaysia and Indonesia (Sumatra). Because of their affinity for water, they do well in wetland areas including mangroves. The Sumatran tiger *Panthera tigris sumatranus* occurs in the newly established (2003) Sungai Sembilang National Park in South Sumatra (Danielsen & Verheugt, 1989), and in combination with adjacent Berbak National Park in Jambi this area may be the best bet for survival of this sub-species in Southeast Asia (Frazier, 1992). In Myanmar, tigers used to be plentiful throughout the country forty years ago, but now at most 150 remain, and it is unknown how many, if any, use the dwindling mangroves.

[7] The Long-tailed Macaque has apparently recently been introduced to South Sulawesi (Giesen *et al.*, 1991)

[8] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1404_full.html

CHAPTER 4 BENEFITS DERIVED FROM MANGROVES

Mangroves are highly beneficial, as they yield many valuable products, while also performing, free-of-cost, many important functions that support the often dense coastal populations. Economically, they are thus highly important, be it at local, regional or even national level.

4.1 MANGROVE USES

Mangroves are very productive ecosystems, and the list of mangrove products commonly used in Southeast Asia is long and impressive (Table 6). The economies of coastal villages are often very dependent on adjacent mangroves, either directly, because of the products they derive from these habitats and are able to sell, or because of the coastal fisheries that are supported by mangroves, or the coastlines that are sheltered from storms. Many commercially important fish, shellfish and prawn species depend on mangroves at least during part of their life cycle (Foo & Wong, 1980; Adiwiryono *et al.*, 1984; Sasekumar *et al.*, 1992; Burhanuddin, 1993), and it has been demonstrated that the productivity of coastal fisheries is directly correlated with the area of mangrove: the more mangrove, the better the fisheries.

Table 5 presents the main direct uses of mangrove plants in Southeast Asia – apparent is that 77 percent of all mangrove plants have some know use, and that many species have a multiple use. The most common use (41% of all species) is medicinal: mangroves are veritable medicine chests for coastal communties. This is followed by construction material at 25 percent, food (vegetable, spice, fruit) at 22 percent, ornamental use at 17 percent and fuel at (at least) 12 percent. Many minor uses are not tabulated, for example, plants used for making skirts, fruits used in games or as storage vessels, or for making food wrappers.

TABLE 5
Quantitative list of plant products in Southeast Asia

Mangrove use	Number of species	Percentage
Medicinal	110	41
Construction material	67	25
Food	58	22
Ornamental	46	17
Fuel*	31	12
Utensils	23	9
Fodder	23	9
Tannin	15	6
Oil & wax	11	4
Rope & binding	11	4
Mats and baskets	10	4
Hedges & fencing	8	3
Dye	8	3
Perfume	8	3
Glue	7	3
Roofing & thatching	5	2
No known use	62	23

* Use as fuel (fuel wood and charcoal) is under reported.
Data is based on the species descriptions provided in Part 2 of this publication

Wood, timber & tannin

For ages, people have exploited mangroves for timber and fuel, and even commercial exploitation has a long history, commencing with the export of timber (esp. durable poles), bark (for tannin) and charcoal from mangrove areas to larger towns. In Indonesia, large amounts of Rhizophoraceae poles are still commonly used for building foundations on soft sediments in coastal areas. Larger scale exploitation of mangroves in Indonesia began early this century, in Java and Sumatra (van Bodegom, 1929; Boon, 1936), but mechanised logging did not really commence until 1972 (Min. of Forestry & FAO, 1990). By 1985, however, 14 companies had been issued licenses for logging concessions covering a total area of 877 200 hectares, or about 35 percent of the mangroves remaining at that time (Min. Forestry & FAO, 1990). Much of the production of these concessions is in the form of wood chips, but also round timber and charcoal are exported. In 1990 these had a total value of about US$25million, up from US$2.6million for logs and US$1.37 million for charcoal in 1978 (Burbridge & Koesoebiono, 1984; chips were not exported). Following a ban on the export of roundwood in the 1990s, the main export was in the form of charcoal and wood chips. In 1998, 330 000 tons of charcoal were produced in Indonesia, both for the local market and for export to Japan, Taiwan and Singapore. At the same time, 250 000 tons of mangrove wood chips were exported to Korea and Japan, at a value of US$10 million[9]. By 2001, all wood chips exported from Indonesia came from Papua province, indicating that concessions in other provinces are depleted[10].

[9] www.jica.or.id/p_Bali2_2.html

[10] www.dephut.go.id/informasi/statistik/Stat2002/contents_02.htm

Box 1. Matang forestry, Malaysia

Matang Mangrove Forest Reserve (MMFR), located on the north-west coast of Peninsular Malaysia, has a long and impressive history of sustainable management. MMFR has been managed for the production of fuel wood and poles on a sustainable basis since 1902-04, when almost the entire area was gazetted as a forestry reserve. By 1908, the entire reserve came under intensive management, which has now been carried out for almost a century (Gan, 1993), making the area one of the world's oldest well-managed mangrove area exploited on a sustainable basis. Some small pockets of dryland forest exist, but the majority of the area consists of a large expanse of mangrove forest, of which 34 769 hectares are classified as 'productive forest' and 5 942 hectares' unproductive forest', managed by the Perak State Forest Department.

Forestry practices at the MMFR are mainly based on the extraction of *Rhizophora apiculata* and *R. mucronata*, for fuel (especially charcoal) and poles. There is a 30-year logging cycle, and about 900 hectare sare harvested annually, of which 800 hectares were for charcoal production, and 100 hectares for poles (MCF, 1987; pers. comm. MMFR 1997). In the past, a rotation cycle of 40 years was tried, but this was found less productive than the current 30 year cycle, which has three thinnings: at 10 years, 15-20 years, and 20-25 years (Ong *et al.,* 1984b). Logging is primarily clear-felling, but at least 5-10 mature trees are left per hectare to ensure an ample supply of seeds and seedlings. Also, a narrow belt of mangrove is left standing along all waterways, to prevent erosion of the river banks. After logging, plots are left for 1-2 years to allow natural regeneration to take hold, following which, enrichment planting - usually with *Rhizophora apiculata*, but also *R. mucronata* - takes place in areas with low stocking rates. About 10 000 seedlings per hectare is deemed optimal. Net productivity of the *Rhizophora apiculata* dominated mangrove forests was found to be in the range of 16-50 tons per hectare, per year (Ong *et al.,* 1984b).

Tannin from mangrove bark has traditionally been an important use of mangroves, and used to be one of the main products. However, in recent years synthetic tannin has to a large extent replaced this use (Hong, 2003).

Mangrove associated fisheries

By far the most important economic gain derived from mangrove products in many areas is that of the coastal fisheries, which depend on particulate organic matter 'exported' from mangroves for food (Boto & Bunt, 1981; Johnstone, 1981; Woodroffe, 1985) and the mangrove environment for shelter (Sasekumar *et al.*, 1992). As stated above, the productivity of these fisheries is directly correlated to the area of mangroves: for every hectare of mangrove cleared, near-coastal fisheries lose approximately 480 kilogramme of fish per year (MacKinnon & MacKinnon, 1986). This compares with an average productivity of 287 kilogrammes per hectare, per year for extensively managed brackish water fishpond or *tambak* in Sumatra (MacKinnon & MacKinnon, 1986).

Certain commercially important species, such as barramundi (ikan kakap) *Lates calcarifer*, mangrove Crab *Scylla serrata* and threadfin salmon *Polynemus sheridani* are directly dependent on mangroves and are caught in this habitat (Griffin, 1985). Indonesia's marine fisheries are largely near-coastal, being carried out by local fishing communities in a little-mechanised fashion, or by commercial fishing fleets operating from larger harbour towns. In 1990, the total production of Indonesia's marine fishery was 2.49 million tons, involving almost 400 000 families, or about 2 million persons (Biro Pusat Statistik, 1993). The total value is not indicated in the national statistics, but is estimated to be in the range of US$500-1245 million; much of this is for subsistence, local markets and the national market. By 2000,

production had increased to 3.7 million tons, not including the 320 000 tons of crustaceans and molluscs (WRI, 2003)[11].

Box 2. Matang fisheries, Malaysia

The Matang Mangrove Forest Reserve is highly important for fisheries, which form the bulk of the income from this area, and targeted species include prawns, shrimps, seabass, mangrove crabs and cockles. While the forests are exploited by the Perak State Forestry Department, fisheries resources are exploited by local fishing communities, and MMFR fisheries are essentially an open-access resource. All fisheries are capture fisheries, although some species, such as sea bass and mangrove crab, may be reared and fattened before being sold. There are no aquaculture ponds.

Fifteen species of penaeid prawn and 5 species of palaemonid prawns are found in the MMFR, with *Parapenaeopsis* species generally preferring the mudflats, and the *Penaeus* and *Metapenaeus* species preferring river mouths and creeks. Mean densities were 7.35 kilogrammes per hectare (4 092 individuals) for rivers and creeks, and 7.19 kilogramme per hectare (2,668 individuals) for mudflats. These areas are important nursery areas for juvenile prawns, which comprise 70-98 percent of the river, and 40-90 percent of the mudflat populations (Chong, 1994). Common prawns in the MMFR are *Penaeus monodon, P. merguiensis* and *P. indicus* (Khoo, 1991). A total of 117 fish species (of 49 families) have been recorded at MMFR, of which the most abundant are the ambassids (18.0%) and the sciaenids (17.5%). Average biomass in river channels was 40.0 kilogramme per hectare, while that of the adjacent mudflats was 30.5 kilogramme per hectare; fish densities were 8 517 and 6 699 individuals per hectare, respectively, for river channels and mudflats. Juvenile fish comprise 85 percent of all individuals, both in river channels and above mudflats (Sasekumar *et al.,* 1994).

Tourism

Mangrove areas are increasingly becoming important for (eco)tourism, education and study, especially in areas where they are readily accessible. In Malaysia, for example, Kuala Selangor Nature Park on the west coast of Peninsular Malaysia, is a popular destination for nature lovers, birders and students, especially as it only an hour's drive from Kuala Lumpur and has accessible trails and walkways through the mangroves. Chek Jawa on Singapore is similarly popular, especially with schools and students, and has its own home page[12]. Indonesian mangroves are generally less accessible, but mangrove islands just off the coast of Java (near Jakarta) such as Pulau Rambut and Pulau Dua, are popular destinations for birders. In Thailand, mangrove sites such as Yaring Mangrove Education Center at Pattani, are popular tourist destinations and much used by local schools.

[11] www.earthtrends.wri.org (2003)

[12] http://habitatnews.nus.edu.sg/news/chekjawa

TABLE 6
Mangrove products

Category & type of use	Examples of species used
Fuel:	
▪ Firewood	Most tree species
▪ Charcoal	Many tree species
▪ Alcohol	*Nypa fruticans*
Construction:	
▪ Timber, scaffolds	*Bruguiera, Rhizophora* spp.
▪ Heavy construction	*Bruguiera, Rhizophora* spp.
▪ Railroad sleepers	*Rhizophora, Ceriops* spp.
▪ Mining pit props	*Bruguiera, Rhizophora* spp.
▪ Boat building	*Corypha saribus (masts), Lumnitzera*
▪ Dock pilings	*Lumnitzera* spp.
▪ Beams & poles for buildings	*Rhizophora, Bruguiera* spp.
▪ Flooring, panelling	*Oncosperma tigillarium*
▪ Thatch	*Nypa fruticans, Acrostichum speciosum*
▪ Matting	*Cyperus malaccensis, Eleocharis dulcis*
▪ Fence posts/water pipes	*Scolopia macrophylla*
▪ Chipboards	Mainly *Rhizophoraceae*
▪ Glues	*Cycas rumphii*
Fishing:	
▪ Poles for fishing traps	*Ceriops* spp.
▪ Fishing floats	*Dolichandrone spathacea, Sonneratia alba*
▪ Fish poisons	*Derris trifoliata, Cerbera floribunda*
▪ Tannings for nets & line	Rhizophoraceae
▪ Rope	*Stenochlaena palustris, Hibiscus tiliaceus*
▪ Anchors	*Pemphis acidula, Rhizophora apiculata*
▪ Caulking of boats	*Atuna racemosa, Osbornia octodonta*
Textiles, leather:	
▪ Synthetic fibres (e.g. rayon)	Mainly *Rhizophoraceae*
▪ Dye for cloth	*Excoecaria indica, Peltophorum pterocarpum*
▪ Tannings	Mainly *Rhizophora, Lumnitzera* spp.
▪ Clothing (skirts)	*Eleocharis dulcis*
Agriculture:	
▪ Fodder, green manure	*Paspalum vaginatum, Colocasia esculenta*
Paper Products:	
▪ Paper of various kinds	*Avicennia marina, Camptostemon schultzii*
Household items:	
▪ Furniture	Many timber species
▪ Decorations	*Xylocarpus granatum, Scaevola taccada*
▪ Glue	*Cycas rumphii*
▪ Hair oil	*Xylocarpus mekongensis*
▪ Perfume	*Phymatodes scolopendria*
▪ Tool handles	*Dolichandrone spathacea, X. granatum*
▪ Pillow stuffing	*Typha angustifolia*
▪ Baskets	*Cyperus malaccensis, Scirpus grossus*
▪ Toys	*Dolichandrone spathacea, Excoecaria indica*
▪ Incense	*Cerbera manghas* (insecticide)
▪ Ornamental plant	*Cryptocoryne ciliata, Crinum asiaticum*
▪ Wax (candles)	*Horsfieldia irya*
▪ Medicines	*Drymoglossum piloselloides, Drynaria rigidula*
▪ Insect repellent	*Osbornia octodonta, Quassia indica*
▪ Vinegar	*Nypa fruticans*
▪ Buttons	*Nypa fruticans*
▪ Charms, decorations	*Nypa fruticans*

TABLE 6
Mangrove products (ctd.)

Category & type of use	Examples of species used
Food, drugs & beverages:	
▪ Sugar	*Nypa fruticans*
▪ Fruit	*Nypa fruticans, Sonneratia* spp.
▪ Alcohol	*Nypa fruticans*
▪ Cooking oil	*Terminalia catappa seeds*
▪ Fermented drinks	*Rhizophora stylosa, Nypa fruticans*
▪ Sweetmeats	*Bruguiera cylindrica, B. gymnorrhiza*
▪ Vegetables	*Stenochlaena palustris, Avicennia, Inocarpus fagifer*
▪ Cigarette Paper	*Nypa fruticans*
▪ Substitute for tobacco	*Loxogramma involuta*
Animal products:	
▪ Fish	*Lates calcarifer, Chanos chanos*
▪ Crustaceans	*Penaeus* spp., *Scylla serrata*
▪ Shellfish	Cockles, mussels, oysters
▪ Honey & wax	Mainly migratory Asian Bee *Apis dorsata*
▪ Birds	Mainly waterbirds
▪ Mammals	Mainly wild boar *Sus scrofa*
▪ Reptiles	*Varanus salvator, Crocodylus porosus* (leather, food)
▪ Others	*Fejervarya (Rana) cancrivora*

Modified from Saenger *et al*. (1983), including information on individual species from Knox and Miyabara (1984), Fong (1984) and this publication, along with several new categories.

4.2 MANGROVE FUNCTIONS

Shoreline protection

Mangroves play an important role in protecting shorelines from waves, winds and storms. The roots of mangrove plants bind and stabilize the substrate, the plants themselves dissipate wave and current energy, and the vegetation as a whole can trap sediments (Davies & Claridge, 1993; Othman, 1994). They offer the best protection against tropical storms, storm surges and tsunamis, and are being replanted in certain areas where they have been felled in the past (e.g. Bay of Bengal, Mekong Delta of Viet Nam) especially for this purpose. In Bangladesh, a storm surge in 1970 killed 150 000-300 000 persons, and in June 1985, 40 000 people were drowned (Maltby, 1986). A study of the 1970 disaster found that about a third of the survivors saved themselves by clinging to trees. Recognising the role of mangroves, the government of Bangladesh replanted a total of 25 000 hectares of mangrove (Maltby, 1986) and is continuing this process at present. One of the few quantitaive studies on wave attentuation reported by Kogo and Kogo (2004), found that a 1.5 kilometre-wide belt of 2 metre tall *Kandelia candel* at Thai Thuy (northern Viet Nam), reduced a 1.0 metre high wave crest to a benign 5 centimetres. Without the young *Kandelia* belt these waves would still have been 75 centimetres tall, and capable of considerable damage.

In October 1999, mangrove forests reduced the impact of a 'super-cyclone' that struck Orissa on India's east coast, killing at least 10 000 people and making 7.5 million homeless. Those human settlements located behind healthy mangrove stands suffered little, if any, losses. According to a report

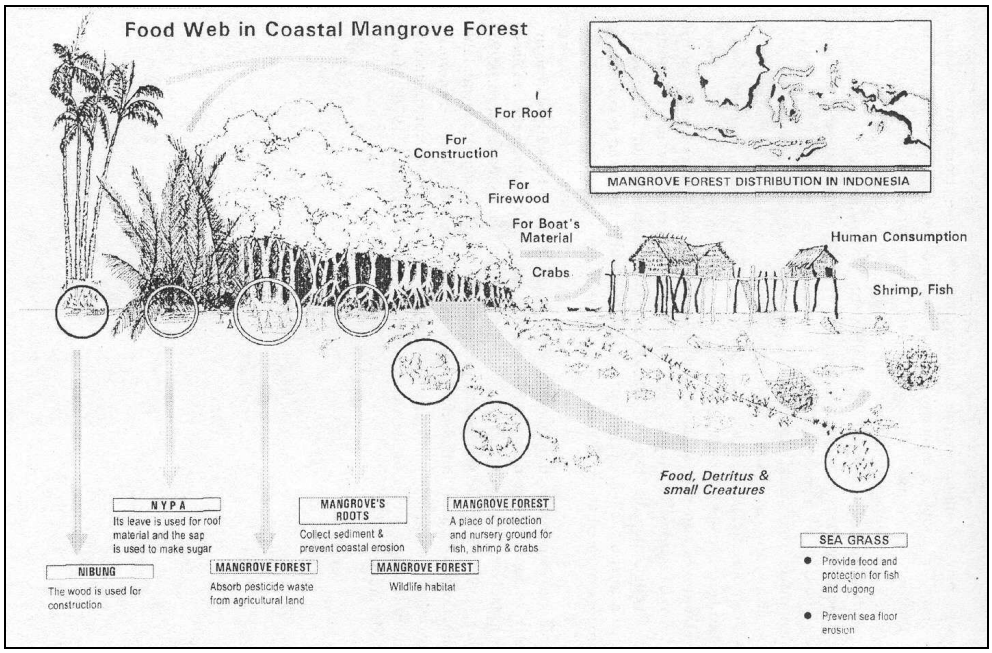
from India, when the tsunami that originated near Aceh, in Sumatra, struck India's southern state of Tamil Nadu on 26 December 2004, areas in Pichavaram and Muthupet with dense mangroves suffered fewer human casualties and less damage to property compared to areas without mangroves (Mangrove Action Project, 4 January 2005[13]). Similar findings are reported for southern Thailand, where evidence suggests that mangroves helped reduce the devastation caused by the tsunami's waves (Harakunarak & Aksornkoae, 2005).

Formerly, sediment binding by mangroves was seen as an active process: "where you have mangroves you would automatically get accretion" (e.g. Steup, 1941), but the consensus now is that mangroves stabilize and bind on already accreting shores (van Steenis, 1958; Chapman, 1976, 1977). Mangrove vegetation can also shield structures, crops and coastlines from damage by strong wind or salt-laden wind.

Support to food web

The role of mangroves in supporting near-shore fisheries is twofold. Firstly, they play an important role in the life cycles of many fish, shrimp and mollusc species (MacNae, 1968; Chapman, 1976; Mann, 1982; Davies & Claridge, 1993; Mastaller, 1997; Figure 6), as these environments provide a combination of shelter and (via the detritus chain) an abundance of organic matter: food. Secondly, mangroves are net exporters of organic matter, thus providing food for organisms that inhabit waters well outside the actual mangrove (Chapman, 1976; Mann, 1982; Sasekumar, 1992; Mastaller, 1997).

FIGURE 6
Food web and use of mangroves in Indonesia



Adapted from a poster produced by Asian Wetland Bureau – Indonesia Programme (1992)

[13] http://www.earthisland.org/map/

Carbon sequestration

Mangroves are able to sequester some 1.5 metric tons of carbon per hectare per year (Ong, 1993; according to Fujimoto, 2004, this may range from 0.22-1.24 tons per hectares per year), and the upper layers of mangrove sediments have a high carbon content, with conservative estimates indicating levels of 10 percent. Conversion of mangroves to fishponds – which invariably involves excavation of about two metres of sediment – will eventually result in a release of about 1 400 tons of carbon from the sediments alone (Ong, 2002). According to calculations by Ong (2002), the conversion of two percent of mangroves to aquaculture already means that the advantage of mangroves as a sink of atmospheric carbon are lost.

4.3 ECONOMIC VALUE OF MANGROVES

Over the past 10-15 years, numerous economic and valuation studies have been carried out on mangrove ecosystems, both in Southeast Asia and beyond (e.g. Ruitenbeek, 1992; Spaninks & van Beukering, 1997; Gammage, 1997; Satharathai, 1997; Bann, 1998; Khalil, 1999, Pearce *et al.*, 2002; PEMSEA, 2004). These consistently show that these systems are highly valuable assets, and of prime importance to coastal communities and local and regional economies. Fisheries are often the most valuable extracted products, followed by timber products (see Table 7), but mangrove services (e.g. coastal protection or biodiversity value) may be worth many times this. A total economic valuation study in Indonesia (Moosa *et al.*, 1996), for example, shows that the archipelago's mangroves and their biodiversity was worth more than US$350 billion, or US$110 000 per hectare if all benefits are included.

TABLE 7
Economic value of various mangrove products

Product	Country	Kg/ha.year	Value (US$/ha.yr)	Year	Ref.
Penaeid shrimp	Various	13-756	91-5 292	1999	1
Mud crabs	Various	13-64	39-352	1999	1
Fish	Various	257-900	475-713	1999	1
Molluscs	Various	500-979	140-274	1999	1
Fish & shrimp	Thailand		30-2 000	1978	2
Shrimp & fish	Malaysia		2 772	1979	4
Fishery products	Malaysia		750	1982	5
Forestry products	Malaysia		225	1982	5
Wood products	Malaysia	16 000-50 000		1984	6
Charcoal & wood chips	Indonesia		10-20	1978	2
Charcoal	Thailand		4 000	1991	3

References:

1. Ronnback, 1999 (cited in Primavera, 2004)
2. Hamilton & Snedaker, 1984 (cited in Primavera, 2004)
3. McNeely & Dobias, 1991 (cites in Primavera, 2004)
4. Gedney, Kapetsky & Kuhnhold, 1982 (cited in Primavera, 2004)
5. Ong, 1982 (cited in Primavera, 2004)
6. Ong, 1984b

Indonesia

A landmark economic study carried out in Bintuni Bay, in Indonesia's Papua province by Ruitenbeek (1992) showed that traditional uses of the 300 000 hectare mangrove area by the 3 000 local inhabitants of the bay were valued at US$10 million per year. At the same time, fisheries were valued at US$35 million per year, and selective mangrove cutting shemes were calculated to be valued at US$20 million per year. Selective cutting of 25 percent of the mangrove appeared to be the optimal strategy, under the likely scenario of 5-year delayed linkages between economics and environment. Other scenarios were found to be less optimal, and the economic benefits of limited selective cutting was found to be greater than the clear cutting option, and the option of more extensive cutting (Ruitenbeek, 1992).

Malaysia

The Matang Mangrove Forest Reserve in Malaysia (see 4.1) is of considerable economic importance to Perak State, and the area is a major supplier of seafood to the local and international market. Revenues from forestry were US$6-9 million annually in the early 1980s (MCF, 1987), and totalled more than US$ 12 million by the late 1990s. In 1979 the value of the prawn and cockle industries in the area was estimated to be at least US$30 million (Ong, 1982). By 1994, the prawn industry alone valued at US$48 million (Sasekumar *et al.,* 1994), and the fishing industry of the area is estimated to be valued at more than US$60 million annually. The total value of the forestry and fisheries alone means that the Matang mangroves are valued at an impressive US$1 800 per hectare, per year. Elsewhere, one square kilometre of mangrove forest was calculated to be capable of sustainably producing 38 tonnes of fish per year, and providing nursery grounds for an added 48 tonnes of fish and shrimp that mature elsewhere each year[14].

Thailand

Studies by Sathirathai (1997) and summarised by the Regional Task Force on Economic Valuation[15] indicate that the total economic value (TEV) of Thai mangroves was in the range of US$520-667 per hectare per year. This calculation included a host of direct uses (timber, fuelwood, wood/animal products), offshore fisheries, coastal protection and carbon sequestration. However, it does not include non use values such as biodiversity, and uniqueness to culture and heritage.

Viet Nam

Studies on mangroves in Qunag Ninh, Nam Dinh, Cuu Long and Ca Mau by Nguyen Ngoc Binh and Huynh Minh Hong (summarised by the Regional Task Force on Economic Valuation[13]) indicate that the total economic value of Vietnamese mangroves was in the range of US$315-1 085 per hectare per year, averaging at US$721 per hectare per year. At the lower end of the scale was Qunag Ninh, where environmental services

[14] http://home.alltel.net/bsundquist1/fi7.html#A

[15] http://www.unepscs.org/Documents/RTF-E1/RTF-E.1-6%20Extracts.pdf

were regarded as zero, as they did not need to mitigate typhoons, and there was no ecotourism. At the upper end of the scale was Nam Dinh in the Red River estuary, where fisheries accounted for two-thirds of mangrove value, but where environmental services and ecotourism were also significant. The valuation study did not include carbon sequestration, nor did it include non use values such as biodiversity, and uniqueness to culture and heritage.

Malacca Straits

A recent valuation study on coastal and marine resources in the Malacca Straits, between Malaysia and Indonesia (PEMSEA, 2004) shows that the TEV of mangrove resources in this area is US$3.25 billion, with a net market value of US$582 million. Of this TEV, US$1.1 billion is attributable to fisheries alone. In Indonesia, Malacca Strait mangroves had a direct use value of US$734 million, of which 80 percent for fisheries, 12.4 percent for charcoal and poles, 6.1 percent for tourism, 1.2 percent for traditional uses and 0.3 percent for wildlife (PEMSEA, 2004).

CHAPTER 5 THE STATE OF SOUTHEAST ASIAN MANGROVES

5.1 PAST AND PRESENT AREA

All over the world mangrove resources are increasingly being lost due to unsustainable utilization and habitat conversion (Snedaker, 1984; Fiseler *et al.*, 1990; Groombridge, 1992; Aksornkoae, 1993, Thurairaja, 1994; Mastaller, 1997), and on the whole, Southeast Asia is no exception. Around 1980, the total mangrove area in Southeast Asia totalled 6.8 million hectares (Table 8), which is about 34-42 percent of the world's total (see 1.2). By 1990, however, this had dropped to under 5.7 million hectares, representing a decrease of about 15 percent or more than 110 000 hectares per year. Between 1990-2000 the annual loss had decreased to 79 000 hectares, but as the total area had also decreased there was still a 13.8 percent decline in mangrove area during this decade.

Brunei Darussalam

Brunei's mangrove area has remained relatively constant since about 1980, having declined from about 18 000 to about 16 000 hectares in 2000 (Table 8), although WCMC report a remaining area of only 7 000 hectares in 1990 (see Table 8). Much of this mangrove area is located around Brunei Bay, and significant amounts are included in the country's protected area system (Scott, 1989).

Cambodia

Cambodia's mangroves dropped from 83 000 hectares in 1980, to less than 60 000 hectares by about 1990 (Fisheries Department Cambodia, 2001), having suffered 'tremendous deterioration' over recent decades. Reliable figures later than 1990 are absent, other than a WRM (2000) website report stating that the government admitted that the total area had deteriorated to about 16 000 hectares. Most (75%) of the remaining mangrove area is found in Koh Kong Province, along with with 13 500 hectares in Sihanoukville, and 7 900 hectares in Kampot and Kep City (Smith, 2001).

Indonesia

Southeast Asia's largest mangrove area occurs in Indonesia, where just under 60 percent of the region's mangroves are located (Table 8). This extended over 4.25 million hectares in 1980, but had been reduced to under 3 million hectares by 2000, with losses of more than 90 percent in some regions (e.g. Java; see 5.2). Giesen (1993) calculated a total mangrove area of 2.49 million hectares remaining by the late 1980s, based on a combination of RePPProT (1985-1989) mapping data, satellite imagery (Sumatra and South Sulawesi) and data on area converted to brackish water fishponds. The 2.5 million hectares figure is now more generally used in Indonesia (e.g. Soegiarto, 2004), although figures ranging between 3-4.5 million hectares are also in use.

By most calculations, more than half (55%) occurs in Papua province, with a further 19 percent in Sumatra and 16 percent in Indonesian Borneo (Kalimantan). Indonesian data, however, are fraught with inaccuracies, and there are two major sources of error. Firstly, there are very few actual calculations of mangrove area, and more often than not, outdated references are quoted again and again[16] (e.g. Burbridge & Koesoebiono, 1980; Burbridge, 1982). Secondly, estimates for the Papuan region vary widely, from 0.97 to 2.94 million hectares (Min. of Forestry & FAO, 1990), mainly because of a lack of reliable data (little ground truthing, few maps or cloud-free remote sensing imagery).

Malaysia

Malaysia is next in terms of mangrove area, harbouring about 11.7 percent of Southeast Asia's mangroves. This extended over almost 670 000 hectares in 1980, but had been reduced to about 570 000 hectares by 2000. Mangroves primarily occur in Sabah (57%), Sarawak (26%) and the west coast of peninsular Malaysia (17%). Of these, 440 400 hectares are reserve forests. About 20 percent of the total mangrove area has been lost to various development activities in the last two decades. The most significant losses have been in Peninsular Malaysia, where large areas have been converted for agriculture, coastal road development and housing estates.

Myanmar

About 8.8 percent of Southeast Asia's mangroves are located in Myanmar, of which 46 percent is located in Ayeyarwady (Irrawaddy) Division, 37 percent in Tanintahryi Division and 17 percent in Rakhine State. The total area was about 530 000 hectares in 1980, but this had dropped to 425 000 hectares by 2000 (Table 8), or perhaps as low as 382 032ha[17]. Prawn and fish ponds are only just being constructed since about 2000 (Maung, 2003). Myanmar's mangroves are reportedly some of the most degraded or destroyed mangrove systems in the Indo-Pacific[18].

[16] www.reefbase.org

[17] http://www.mangroveweb.net/html/country.htm

[18] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1404_full.html

Papua New Guinea

According to most references, Papua New Guinea has about 8.7 percent of Southeast Asia's mangroves, extending just over 500 000 hectares in the 1980s (see Table 8). Areas remain fairly stable, and by 2000 mangrove area amounted to just over 400 000 hectares. WCMC, however, report that only 200 000 hectares existed in the 1970s (Table 8), perhaps because island fringing mangroves were not included ion their calculations. The largest areas of mangroves occur in the south, especially along the Gulf of Papua into which several large rivers flow (e.g. the Fly, Kikori and the Purari). On the whole, the north coast is not as rich in mangroves as the south coast, although several species such as *Avicennia alba* and *Sonneratia caseolaris* appear to be confined to the north coast[19].

The Philippines

The Philippines harbours about 2.2 percent of Southeast Asia's remaining mangrove area. Brown and Fisher (1918; cited by Primavera, 2004) calculated that the Philippines had a total mangrove area of 500 000 hectares at the turn of the last century. According to Aragones *et al.* (1998), Janssen and Padilla (1996) and Aypa and Baconguis[20], Philippine mangroves declined from 418 990 hectares in 1967 to 288 035 hectares in 1970, 204 253 hectares in 1987 and 123 400 hectares in 1993. By 2000 it was estimated that this had further declined to just over 100 000 hectares (Table 8). According to Davies *et al.* (1990) only 119 000 hectares remained in 1990, of which only 81 400 hectares could be classified as undisturbed (Petocz, 1988). Much of this decline seems linked with the development of brackish water aquaculture (see below; Janssen & Padilla, 1996).

Singapore

Formerly, about 13 percent of Singapore island consisted of mangrove forest, but nowadays less than 0.5 percent (500 ha) remain. Some of this is protected in several small reserves, such as Sungai Buloh[21].

Thailand

According to Aksornkoae (1993), Thailand had 367 900 hectares of mangrove in 1961, which was reduced to 174 000 hectares by 1990 (Wattayakorn, 1998), and had reportedly further declined to 167 582 hectares by 1996. Most of this dramatic decline appears to have been between 1975-1991[22].

Since the mid-1990s, however, two changes have occurred in Thailand that have reversed this trend of decline. Firstly, the method by which the Royal Forest Department (RFD) assessed forest areas changed: formerly they interpreted imagery at a scale of 1:250 000, but in the latest assessments (e.g. 2002), imagery at a scale of 1:50 000 was used. This change in scale

[19] http://earthtrends.wri.org/pdf_library/country_profiles/Coa_cou_598.pdf

[20] http://www.mangroveweb.net/html/country.htm

[21] http://mangrove.nus.edu.sg/guidebooks/text/1016.htm

[22] (www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1402_full.html).

made the assessment of mangrove areas more accurate, and also allowed the inclusion of smaller areas in the overall calculation. Secondly, Thailand has invested in large-scale reforestation programmes in abandoned shrimp pond areas and other degraded sites since the late 1990s. The net effect has been that by 2000, the total mangrove area was determined to be 244 161 hectares (RFD Forestry Statistics 2002). As a result, Thailand is the only Southeast Asian country that has witnesed an increase in mangrove area during the past decade, although total areas are still well below what was present in the 1960s.

Thailand presently has just under five percent of Southeast Asia's mangroves, covering large areas along the western peninsula coast and also along the eastern peninsula coast, in the Chao Phraya delta and along the south-eastern coast. The best developed mangrove forest in Thailand occurs on the west coast of the peninsula in Ranong, Phang Nga, Krabi, Trang and Satun. Mangroves in the inner and western part of the gulf of Thailand are mainly converted into shrimp farms, while the remaining mangroves are largely composed of small sized trees.

Timor-Leste

Timor-Leste's mangroves extend over just 3 000 hectares, and are found mainly on the north coast of the island, where the sea is calmer, especially near Metinaro, Tibar and Maubara. Along the south coast mangroves are not found beyond the mouths of streams and adjacent swampy areas[23].

Viet Nam

Viet Nam has about 2.1 percent of Southeast Asia's mangroves (just over 100,000 hectares in 2000), and the largest area of remaining mangroves is around Ca Mau Point at the southern tip of Viet Nam, with smaller areas in the Mekong delta region (together 66 percent of remaining mangroves), in south central Viet Nam around Cam Ranh Bay, and in northern Viet Nam in the Red River delta area (13%) and in Quang Ninh Province (15%). The central coast of Viet Nam (2%) is largely free of mangroves because of the exposed coastline, absence of major river deltas, and low tidal fluctuations in this area. Far more extensive stands of mangroves once occurred, with 408 500 hectares being recorded in 1945 and 290 000 hectares in 1953 (Hong, 2003). The extensive military use of defoliants and napalm during the Viet Nam War (1962-1972) destroyed a major part of mangrove forests, especially in southern Viet Nam, but these are recovering under active reforestation programmes[24].

[23] http://www.uc.pt/timor/florafauna.html

[24] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1402_full.html

TABLE 8
Changes in mangrove area 1980-2000

	Most recent reliable mangrove estimate		Mangrove area (ha)	Mangrove area (ha)	Mangrove area (ha)	Percentage of total	Annual change (ha/yr)		WCMC figures		Least optimistic
	ha	year	1980	1990	2000		1980-1990	1990-2000	ha	year	1990s
Brunei Darussalam	17100	1992	18300	17300	16300	0.33	-100	-100	7000	1990	16300
Cambodia	72835	1997	83000	74600	63700	1.30	-840	-1090	60000	1989	16000
Indonesia	3493110	1988	4254000	3530700	2930000	59.79	-72330	-60070	4200000	1987	2496000
Malaysia	587269	1995	669000	620500	572100	11.67	-4850	-4840	630000	1985	572100
Myanmar	452492	1996	531000	480000	432300	8.82	-5100	-4770	517500	1982	382186
Papua New Guinea	464000	1993	525000	492000	425000	8.67	-3300	-6700	200000	1970	425000
Philippines	127610	1990	206500	123400	109700	2.23	-8310	-1370	232100	1987	109700
Singapore	500	1990	2700	500	500	0.01	-220	0			500
Thailand	244161	2000	285500	180559	244161	4.98	-10500	6360	196400	1987	167582
Timor-Leste	3035	2000	4100	3600	3035	0.06	-50	-57			3035
Viet Nam	252500	1983	227000	165000	104000	2.12	-6200	-6100	370000	1987	104000
Total	**5714612**		**6806100**	**5688159**	**4900796**	**100**	**-111800**	**-78737**	**6413000**		**4292403**

Recent reliable figures. Brunei Darussalam: Spalding *et al.* (1997); Cambodia: Department of Forestry and Wildlife (1998); Indonesia, Malaysia and Myanmar: FAO (2003); Papua New Guinea: Saunders (1993); Philippines: Melana (1994); Singapore: Chan & Corlett (1999); Thailand: Thailand RFD Statistics 2002; Timor-Leste: www.ci.uc.pt/Timor/florafauna.html; Viet Nam: Hong & San (1993).

Least optimistic figures. Brunei: Zamorra (1992); Cambodia: WRM (2000), Myanmar, Singapore: Mackinnon (1997); Indonesia: Spalding *et al. (1997);* Malaysia: Chan *et al.* (1993) ; Philippines: White & de Leon (1996); Viet Nam: ADB (2000).

WCMC figures: http://www.wcmc.org.uk/marine/data/coral_mangrove/marine.maps.main.html

5.2 CAUSES OF DECLINE

Direct causes of mangrove decline

Developments that have contributed to decline of Southeast Asian mangroves are commercial logging, conversion to brackish water fishponds, agriculture (mainly rice paddies and coconut), fuelwood and charcoal production, and conversion for housing. The impact of each of these varies per country. In countries with major fishing industries such as Thailand, Indonesia, the Philippines and Viet Nam, conversion to brackish water aquaculture is a major agent of change. In small, densely inhabited Singapore the need for land for housing and industry has lead to infilling and disappearance of mangroves. Myanmar and Papua New Guinea have a less developed fishing industry and no great shortage of land, hence there has been little conversion other than for forestry and fuel production.

Underlying causes of mangrove decline

A complicating factor in mangrove conversion is often land ownership. Legal ownership of mangroves is complicated due to the many different institutions involved, unclear land allocation procedures, and lack of a centralised up-to-date administration of land titles. Mangrove land can be obtained relatively easily and at low investment costs for the development of tambak and housing estates. This low cost does not reflect the true market value of mangroves, a problem that seems to occur throughout Southeast Asia (Othman, 1995; Thurairaja, 1994). Permits may be provided without proper consultation of higher authorities, a problem that is exacerbated by sectoral approaches, with one agency approving what another might find undesirable (e.g. conversion of 2 500 hectares of Karang Gading Langkat Timur Laut in North Sumatra in the 1980s; Giesen & Sukotjo, 1991).

Local people have exploited mangroves for eons, usually without noticable degradation of this environment. This has changed during the past decades, however, with increased internal (e.g. population) and external (e.g. investment, immigration) pressures. To quote Fiselier *et al.* (1990): "Reclamation for aquaculture and agriculture is currently considered the main way to achieve development of mangrove areas. These types of reclamation are costly, often unsustainable, and have adverse environmental effects. They mainly benefit outsiders, and to a lesser extent local communities, to the prejudice of those traditionally engaged in fisheries and the gathering of forest products." This is supported by Ong (1982) in his discusssion on mangrove conversion in Malaysia, who concludes that "... both economics and ecology argue against aquaculture."

Cambodia

The main threats to Cambodian mangroves have been from conversion to aquaculture, charcoal production, and salt pan construction. Unregulated exploitation of mangroves for firewood and charcoal took place during the Pol Pot era and further intensified since the 1990s, both for commercial and export purposes. In Peam Krasoap (Koh Kong District) alone, for example,

the number of kilns for producing mangrove charcoal increased to 300 by mid 1996, using 26 760 cubic metres of mangrove wood (Sour, 2003). Although exact figures are lacking, the greatest threat to Cambodian mangroves has been from conversion to shrimp ponds, especially in the area close to the Thai border, where local communities have cleared and converted mangroves following investments by Thai businessmen. Ponds in this area have been heavily impacted by disease, with shrimp production dropping from 731 tons in 1995, to just 52 tons in 2002. As a result, many ponds have been abandoned. Some mangrove areas have also been cleared for construction purposes and for establishing salt pans, especially in Kampot province and Kep Municipality (Sour, 2003).

Indonesia

While conversion for aquaculture contributed about 25 percent of the loss of mangroves (see 5.3), the remaining 75 percent seems to stem from a combination of a) conversion to agriculture, b) growth of secondary (non-forest) vegetation after over-exploitation by coastal communities, c) lack of forest regeneration after commercial logging, and d) coastal erosion (likely to be very minor factor).

Commercial logging of mangroves formerly centered on Riau, South Sumatra, Aceh and Kalimantan provinces, but present activities are mainly in Papua. The area under logging concession has increased from 455 000 hectares in 1978 (Burbridge & Koesoebiomo, 1980) to 877 200 hectares in 1985 (Min. of Forestry and FAO, 1990), or about 35 percent of the remaining area of mangroves at the time[25]. It is difficult to assess the effect logging has had on mangrove loss, however. Nurkin (1979) describes how former mangrove areas in South Sulawesi were invaded by *Acrosticum aureum* ferns following logging operations, a process that often affects mangrove regeneration. However, in other areas mangroves re-establish themselves vigorously, for example in Southeast Riau province, Sumatra (Giesen, 1991b), and in remnant mangroves of Sungei Kecil in West Kalimantan, Indonesia (Abdulhadi & Suhardjono, 1994).

Regeneration does not always imply that the same vegetation returns, however, and quite often less desireable tree species may become dominant, such as *Xylocarpus granatum* (Bakung Island, Riau; Giesen, 1991b), *Excoecaria agallocha* and *Bruguiera parviflora* (both at Karang Gading Langkat Timur Laut, North Sumatra; Giesen & Sukotjo, 1991). Sustainable logging of mangrove forests seems to be a possiblity, because of the rapid regeneration, the availability of sufficient nutrients and the relatively simple vegetation structure. However, sustainable forest management generally implies a removal of commercially less-desired species, and thus decrease of biodiversity. Old trees are harvested which causes a significant decrease of epiphytes, parasites and climbers.

[25] This did not include the Marubeni concession in Bintuni Bay, Papua, which was more than 250 000 hectares, but has been cancelled since then.

A rather recent development is land-reclamation of former mangrove areas for housing and recreation estates. In Indonesia this started with the succesful reclamation of the Ancol marshlands, on the outskirts of Jakarta, in the early 1970s. After that the Pluit marshlands were reclaimed, and reclamation is still continuing in a westward direction. These land reclamation activities are not confined to the urban parts of Java; the city of Ternate (Maluku) is planning to reclaim 30 hectares of former mangrove area (*Kompas*, August 9, 1996).

Malaysia

About 20 percent of Malaysia's total mangrove area has been lost to various development activities in the last two decades. The most significant losses have been in Peninsular Malaysia, where large areas have been converted for agriculture and housing estates, but also to make way for coastal roads. Aquaculture development, however, has been limited. According to the Malaysia Nature Society, Peninsular Malaysia has lost more than one-third of its mangrove forest during the past two decades, a lot of it cleared illegally. Only a relatively small percentage has been lost to aquaculture development (see 5.3), which totalled about 5 100 hectares in 2002.

Myanmar

According to WWF[26], Myanmar's mangrove forests are subject to severe degradation because there is no clearly defined land-use system. Mangrove forests have been converted to agriculture and other development activities throughout the country. They have also been felled on a large scale to meet the domestic demand for fuelwood and charcoal production. By 2000, there were about 12 000 hectares of shrimp ponds in former mangrove areas, and there were plans for conversion of another 40 000 hectares for this industry[27]. The Irrawaddy River is one of the most heavily silted rivers in the world, and with a sedimentation rate of 299 million tons per year, and it ranks fifth behind the Yellow, Ganges, Amazon, and Mississippi rivers in silt deposition. The sedimentation rate is getting worse as deforestation and agricultural erosion continue. If the situation between 1977 and 1986 is maintained, it was estimated that all the mangrove forests will disappear in fifty years.

Philippines

According to Aragones *et al.* (1998) and Aypa and Baconguis[28] the main causes of decline of mangroves in the Philippines are charcoal and firewood utilisation, followed by the expansion of agricultural areas, fishponds, urban and industrial development, harbor construction, mining and housing projects. According to Janssen and Padilla (1996), however, shrimp pond construction is the main contributing factor, and this is supported by their data (Figure 7). According to Alvarez (1984), the main cause up to the 1980s was a combination of legal and illegal felling.

[26] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1404_full.html

[27] www.mangroveweb.net/html/country.htm

[28] http://www.mangroveweb.net/html/country.htm

Thailand

Some areas of mangrove forest have been reclaimed for urban development and agriculture, but the main driving force behind the decline of the country's mangroves has been aquaculture (Aksornkoae, 1993). According to Wattayakorn (1998), conversion to aquaculture accounted for 64 percent of mangrove loss between 1960-1990, while coastal development (urbanisation, industrial expansion, infrastructure, ports and habours) accounted for 24 percent. Thailand's mangroves have been heavily exploited for shrimp farming since 1975 (see 5.3), and especially during 1985-1990 (Aksornkoae, 1993). Most of the remaining mangroves (143 961 ha) are under concessions designated for charcoal production, and at present they are controlled by 40 mangrove mangement units. Large areas of mangrove have been logged for charcoal production, to supply the domestic market and markets in Malaysia, Singapore, and Hong Kong (Spalding *et al.* 1997[29]).

Viet Nam

Before 1945, Viet Nam had an estimated 408 500 hectares of mangrove, which subsequently declined to about 290 000 hectares by 1953. The mangrove forests of the Mekong Delta – especially in Can Gio and the Ca Mau peninsula – were extensively damaged by bombs and defoliants, the most notorious of which was 'agent orange'[30]. The major use of herbicides during the war was from 1966-1970, which resulted in the almost total destruction of the delta's mangroves – a loss of 149 851 hectares of forest – and along with it much of the accompanying biota (Hong, 2003). Even by the early 1990s, satellite images still showed patterns left by the defoliants – broad swathes of vegetation differing in texture and colour. Since the end of the conflicts there have been two major developments: fish and shrimp ponds (see 5.3), and a widespread reforestation drive. By 1999, Viet Nam had an estimated 155 290 hectares of mangrove, of which 96 876 hectares were planted in a number of reforestation programmes (Hong, 2003).

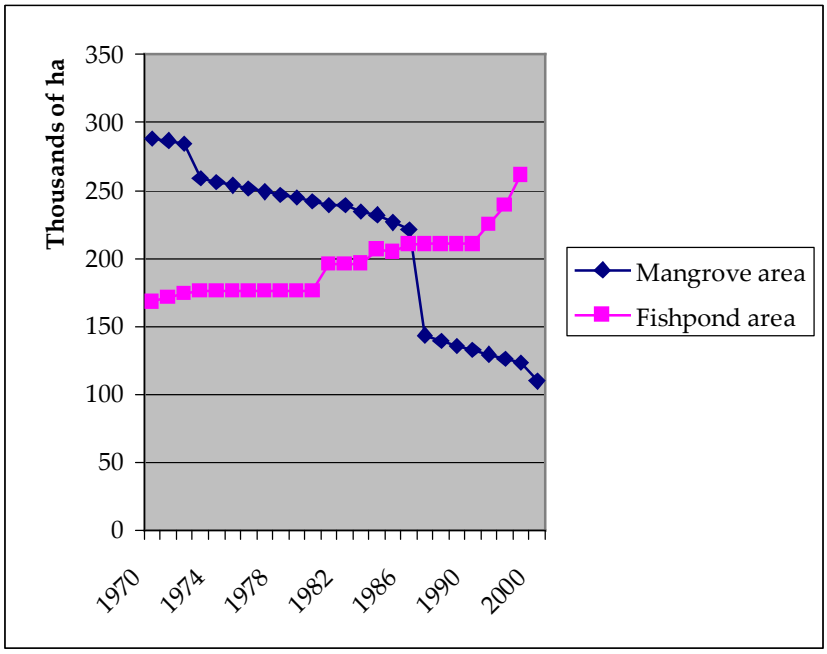
5.3 MANGROVE CONVERSION FOR AQUACULTURE

More than 1.2 million hectares of mangrove in Southeast Asia have been converted to brackish water fishponds (see Table 9), and it is regarded as probably the greatest single cause of mangrove decline in the region. Although not all brackish water fishponds have been converted from mangroves, most have been established in (former) mangrove areas, and in most countries in Southeast Asia the link is very evident. In the Philippines, for example, the loss of mangroves from 1970 to 2000 was almost 180 000 hectares, mirroring the 93 000 hectares of brackish water fishponds that were developed during the same period (Figure 7).

[29] http://www.assn.moe.go.th/MANGROVE%20RESOURCE%20MANAGEMENT.htm.

[30] Agent Orange was a 50/50 mix of two herbicides, 2,4,-D (2,4, dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5 trichlorophenoxyacetic acid). Of major health concern is the contamination with dioxin.

FIGURE 7
Mangrove conversion and fishpond area in the Philippines



Adapted from Janssen & Padilla (1996)

Figures for brackish water fishponds in Southeast Asia have been compiled (Table 8). Four countries (Thailand, Indonesia, Viet Nam and the Philippines) have each developed well over 200 000 hectares of brackish water fishpond, and more than a million hectares of mangrove have been converted to fishponds over the past three decades alone (Table 8). Other countries such as Myanmar have only minor fishpond industries, but have developed plans for similar large-scale development.

Indonesia

In Indonesia, where these ponds are called *tambak*, a total area of almost 269 000 hectares already existed by 1990 (Directorate General of Fisheries, 1991; see chapter 5). There was a surge in *tambak* development in the 1990s, and by 2001 the total area had increased to 438 010 hectares[31] (see Figure 8). Previously, these fishponds were established within mangrove forest and trees were retained on pond dikes or on islands in the *tambak*. Later, however, clear-felling was carried out prior to the construction of a *tambak*, leaving these more recent fishponds with a tree cover of almost zero. Many of these *tambak* are exploited on an extensive basis, and shrimp fry are usually obtained from adjacent mangrove areas. In many cases, *tambak* development is carried out to obtain land titles to formerly communally-held areas, or areas of government land.

[31] http://www.perikanan-budidaya.gov.id/statistik/tambak/budidaya_tambak.htm

TABLE 9
Brackish water fishponds in Southeast Asia

Country	Area of brackish water fishponds (in ha)	Year	Reference
Brunei Darussalam	190	1995	http://www.mangroveweb.net/html/country.htm
Cambodia	>800 850	2000 1994	Smith (2001) http://www.mangroveweb.net/html/country.htm
Indonesia	438 010	2001	www.perikanan-budidaya.go.id/statistik/tambak/budidaya_tambak.htm
Malaysia	4 700 5 100	1995 2002	http://www.mangroveweb.net/html/country.htm http://www.wrm.org.uy/deforestation/mangroves/book8.html
Myanmar	minor 12 000*	2003 2001	Maung (2003) www.mangroveweb.net/html/country.htm
Papua New Guinea	minor?		
Philippines	261 402	1993	Janssen & Padilla (1996)
Singapore	minor		
Thailand	253 000	1995	http://www.wrm.org.uy/deforestation/mangroves/book8.html
Timor-Leste	minor	?	
Viet Nam	249 394 220 000	1998 2000	Tabuchi (2003) Hong (2003)
TOTAL	1 219 946		

* According to www.mangroveweb.net/html/country.htm, there were plans in 2000 for the conversion of a further 40 000 hectares to shrimp ponds.

In 2001, about 34.0 percent of all *tambak* were located in Java, while a further 28.2 percent were located in Sulawesi, 23.4 percent in Sumatra and 10.8 percent in Kalimantan, which has seen the latest surge in this development. The coastal areas of the northern part of East Kalimantan, around the estuaries of the Kayan, Sesayap and Sebuku rivers, were until recently covered with broad expanses of mangroves. Most of these have however been converted to prawn ponds in the last decade.

The shrimp industry is a highly valuable one, providing the country with very high revenues. In 1992, for example, exports of shrimp from Indonesia were valued at US$680 million, of which 65 percent went to Japan, 16 percent to USA and 9 percent to Singapore (Biro Pusat Statistik, 1993). Shrimp exports increased from 97 228 metric tons in 1989, to 117 847 metric tons in 1998[32]. A second important product from *tambak* are milkfish *Chanos chanos*, which are very popular in Sulawesi and Java. In the 1970s milkfish was the principle crop of all *tambak* (Shang, 1976), but this has been displaced by shrimp since 1979 (Djajadiredja, 1981). Many ponds for prawn production were made by simply deepening former milkfish ponds. Prawn *tambak* are capital intensive enterprises that need a high energy input, and

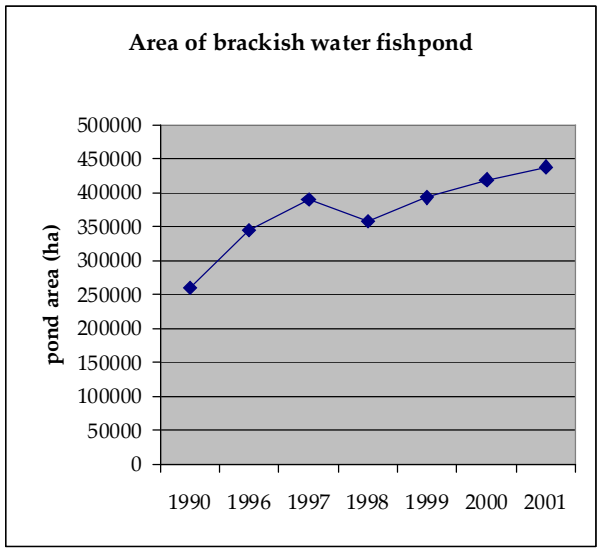
[32] http://www.wrm.org.uy/bulletin/51/Indonesia.html

their establishment usually requires provision of electricity. In contrast with ordinary *tambak*, which are operated by local farmers, prawn ponds are usually operated by urban enterpreneurs.

The total of 438 010 hectares of *tambak* correspond to more than 10 percent of the former mangrove area, which means that brackish water fish pond development may be responsible for about 25 percent of mangrove loss. In the late 1990s there were plans to expand the total area by a further 320 000 hectares, but this expansion has since been slowed down by the 1997-1998 financial crisis (see Figure 8).

The occurrence of *tambak* does not always mean an absence of mangroves, as is exemplified by the Javan *tambak tumpang sari* fishpond system, whereby a central part of the pond is purposely left shallower and vegetated with mangroves. *Tambak tumpang sari* is a multiple use system involving joint production of mangrove forestry and fishery produce (Sukardjo, 1989); the system is also relatively benign, and can be of importance for maintaining mangrove forest (in some form or other; Sukardjo, 1989) and waterbird populations (Erftemeijer & Djuharsa, 1988). Sometimes vegetation is retained along creeks in fishpond areas, and here the last specimens of mangrove species formerly common in the area can often be found.

FIGURE 8
Area of brackish water fishpond (tambak) in Indonesia, 1990-2001



Note: the area of *tambak* in Indonesia almost doubled in the period 1990-2001, in spite of the financial crisis in Southeast Asia in 1997-98, which led to a temporary decrease in investments, including in the fishpond sector.

Other Southeast Asian countries

Similar developments have occurred in other Southeast Asian countries. Sour (2003) notes that most of the mangroves converted in Cambodia (19 700 hectares in Koh Kong Province alone since the 1990s) have been converted to shrimp ponds. Cambodian mangrove forests near the Thai

border have been cleared by local communities and Thai businessmen, but due to the outbreak of shrimp diseases many of these ponds have now been abandoned.

In Viet Nam's Ca Mau Province, in the Mekong Delta, the area of mangroves declined from over 200 000 hectares in 1962 to 64 572 in 1999, and according to Tan (2001; cited in Hong, 2004) almost all of this destruction has been due to the shrimp culture. There are also plans for further conversion of at least 13 000 hectares in the near future. According to Benthem *et al.* (1999), mangrove forests in Ca Mau had declined from about 200 000 hectares in 1943 to 51,492 hectares in 1995, while shrimp farm acreage increased from 3 000 hectares in 1984 to 76 036 hectares in 1995. According to Tabuchi (2003), the acreage of shrimp ponds in Viet Nam increased from 96 060 hectares in 1990 to 249 394 hectares in 1998.

In Myanmar there has also been extensive conversion (Maung, 2003), but unlike in Cambodia, Thailand, the Philippines and Viet Nam, this has been mainly for agriculture and salt production. The shrimp industry in Malaysia has developed rapidly since the early 1980s, but the country is not one of the major producers of cultured marine prawn in the world, as the area under marine prawn culture is about 5 100 hectares (2 627 hectares in 1995). However, the country's average production (metric tons/ha) is the third highest in the world, after Taiwan and Thailand, and plans for intensification and expansion have been drawn up[33].

5.4 MANGROVE RESTORATION

Introduction to mangrove restoration

Mangrove restoration and rehabilitation is becoming increasingly important in Southeast Asia, especially as the effect of loss of mangroves becomes apparent in the form of loss of coastal fisheries productivity, loss of livelihood of coastal communities, and loss of life and property in the wake of storms and tsunamis. Promotion of regeneration of mangroves has been the goal of mangrove foresters in Southeast Asia, especially in Malaysia and Thailand, leading to establishment of nurseries and enrichment planting since the days of Watson (1928).

Restoration or rehabilitation of mangroves is often recommended when the ecosystem has been altered to such as extent that it cannot regenerate naturally. However, the concept has not been analysed or discussed much in mangrove literature, and as a result, those managing mangrove restoration frequently emphasize planting of mangroves as the primary tool in restoration (Lewis & Streever, 2000). Mangrove habitat can regenerate naturally in 15-30 years if: i) the normal tidal hydrology is not disrupted, and ii) the availability of waterborne seeds or seedlings (propagules) of mangroves from adjacent stands is not disrupted or

[33] http://www.wrm.org.uy/deforestation/mangroves/book8.html

blocked. If hydology is still (near-)normal, but influx of seeds or seedlings is disrupted, then mangroves may be successfully established by planting (Lewis & Streever, 2000).

In order to achieve successful mangrove restoration, the following five critical steps need to be taken:

a. Understand the autoecology (i.e. individual species ecology) of the mangrove species at the site, in particular the patterns of reproduction, propagule distribution, and successful seedling establishment.
b. Understand the normal hydrologic patterns that control distribution and successful establishment and growth of targeted mangrove species.
c. Assess modifications of the original mangrove environment that currently prevent natural secondary succession.
d. Design the restoration programme to restore appropriate hydrology and, if possible, utilise natural volunteer mangrove propagule recruitment for plant establishment.
e. Only utilise actual planting of propagules, collected seedlings, or cultivated seedlings after determining (through steps a-d) that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilisation, or rate of growth of saplings established as objectives for restoration (Lewis & Streever, 2000).

In a logged mangrove area in Tembilahan, Indonesia, for example, Soemodihardjo *et al.* (1996) found that only 10 percent of the area needed replanting, as the rest of the area had seedling densities of more than 2 500 per hectare, more than enough for natural regeneration.

Practical guidelines for restoration

Mangrove reforestation may be carried out as a phase of a forestry system for sustainable management, as part of a coastal restoration project or simply just to restore a mangrove ecosystem. Exploitation of mangrove forests results in gaps and an open canopy. Generally, if these open patches are not too large and a sufficient number of seed-trees are available, regeneration will occur naturally. In controlled cases, species composition can be manipulated by eliminating undesired seed-trees, but generally the number of species around the gaps will be limited. Productivity of individual trees can be enlarged by carrying out a thinning after 2-5 years, if the young stand is very dense. Control of climbers (especially *Derris* species) and mangrove ferns (*Acrostichum aureum*) is often necessary as they often grow very vigorously in disturbed forests. In some areas *Acanthus ebracteatus* can form a dense cover that prevents regrowth – this was the case in the Tumpat Delta, Kelantan in Peninsular Malaysia, where Sulong *et al.* (2002) found that 25 percent of the mangrove area was covered by this species.

Reforestation of open mudflats is possible with natural regeneration if a sufficient supply of seeds, brought by the currents, is present. The emerging species will be the common pioneer species that naturally occur in that area. If the supply of seeds is insufficient, or if it is desirable that the

species composition shows more variety, sowing of (additional) seeds is an option. Re-greening programs are sometimes applied in fishpond areas, involving the sowing or planting of mangrove trees along fishpond dikes. Planting of young trees in the fishponds themselves is not successful as they cannot tolerate permanent inundation. Unfortunately, very often the exotic species *Acacia auriculiformis*, which can become a harmful pest, is planted in such projects in Southeast Asia. *Acacia auriculiformis* leaves form a litter layer with allelopathic characteristics, i.e. growth of other plant species is inhibited.

Successful reforestation of fishpond areas requires the restoration of original soil conditions and hydrology. Earthworks need to be carried out to remove the fishpond dikes and close the fishponds. Fishpond dikes are usually constructed with soil derived from pond excavation (Wulffraat, 1996b). Therefore, restoration can be carried out by simply reversing this process, and filling the ponds with the material from the surrounding dikes. This should preferably done by hand, as levelling by bulldozers requires draining until the area is dry enough for entering, and this often has a very negative impact on the soil chemistry.

Planting instead of sowing is a good option if the availability of seeds is limited (difficult to obtain or expensive) and if the success rate of sowing is questionable. The latter can be the case if, for instance, the area is very open, with unfavourable climatic conditions or strong waves, and if seed-(or seedling-)eating crabs are abundant or germination of certain species is difficult. To boost the rate of success, one may opt for establishing a mangrove nursery. The nursery should preferably be established in (former) mangrove areas, where original mangrove soil is available. Young plants can occasionally be flooded by seawater, but this is not necessary. A source of freshwater (not seawater) should be readily available, as young plants need regular watering in the first stage.

Mangrove plants can be grown best in plastic bags (polybags, diameter 20 cm), as this provides the best possibilities for their development, and with the least damage to their (complicated) root system. The bags should be filled with the original mangrove soil. Large seeds or propagules with a high germination success rate could be put directly in the bags, but for all other seeds it is advisable to let them germinate first in special germination trays. These germination trays should be filled with pure sand, with a humus content as low as possible, to avoid development of fungi. Seeds do not need external nutrients for germination. Some seeds need a treatment before being sown. Fruits of *Sonneratia* species, for instance, must be kept in wet sand until they are rotten; then the seeds are removed and let dry for a few hours, before they are sown (Wulffraat, 1996b).

After the seedlings start developing their second pair of leaves, they can be carefully transplanted to polybags. Seedlings of most species prefer some protection from direct sunlight for optimal growth. Seedlings are ready for planting in the field as soon as they have developed a rather strong stem,

usually when they are 30-60 centimetres high. Development of special roots (aerial roots, pneumatophores etc.) starts soon after planting in the field. Planting should preferably take place in a period when low tides occur (partly) during daytime and very high tides occur less often (Wulffraat, 1996b).

As a general rule, mangrove seedlings should be planted with 1 metre spacing, i.e. at a density of 10 000 per hectare. High initial mortality is not unusual, but survival rates of at least 50 percent should be expected. Typical forest density of mature mangroves is about 1 000 trees per hectare, so a 50 percent initial mortality of planted saplings should not lead to an unusually sparse forest (Lewis & Streever, 2000). Indeed, a round of thinning may be required in years 5-10 to prevent the establishment of 'pole forests', i.e. dense stands of thin, tall trees, as these may be particularly susceptible to storm damage.

According to Lewis (2001), the cost of mangrove restoration usually varies from US$225 per hectare to US$216 000 per hectare, depending on the location and technique used. Lewis recognises three approaches to restoration: i) planting alone, ii) hydrologic restoration, with or without planting, and iii) excavation or fill, with or without planting. The first type is cheap, costing only US$100-200 per hectare, but is often unsuccessful as hydrological aspects are not appreciated. The second type, when done with proper planning, can also be inexpensive and have a high rate of success. The third type is usually expensive and viable in developed countries only.

Indonesia

Mangrove restoration in Indonesia has been carried out for more than 10 years, generally carried out by NGOs and/or by donor aided projects, but also by the Forestry Department. Areas replanted have been modest, and during the period 1998-2002, for example, a total area of 7 130 hectares were replanted[34], mainly in West and Central Java, North Sulawesi and North Sumatra. Almost 3 000 hectares of damaged mangroves have been rehabilitated in Cilacap on the south coast of Java over the last few years, funded out of a loan of more than US$45 million for conservation and development of this lagoonal system (ADB, 1996; Soegiarto, 2004). Similarly, more than 10 000 hectares of former mangroves have been replanted and restored on the north coast of West Java (Soegiarto, 2004). The latter were part of an aid scheme aimed at reducing flood damage in Jakarta, while at the same time taking local socio-economic conditions into account. Persons living in the vicinity of the replanted areas are allowed to catch or culture fish in the broad channels surrounding the rehabilitated mangroves for their livelihood. Several mangrove replanting projects have been carried out in Kupang Bay, West Timor, by Japanese organisations and NGOs since the early 1990s. *Rhizophora* and *Avicennia* seedlings were used in the north coast of West Java rehabilitation programme, whereas

[34] www.dephut.go.id/informasi/statistik/Stat2002/contents_02.htm

Rhizophora and *Bruguiera* species were used in the Cilacap mangrove area. The survival rate of replanting was reported between 60-75 percent.[35]

Myanmar

In the Irrawaddy (Ayeyarwady) Delta, mangrove forest plantations were established on a small scale basis from 1980 onwards in the townships of Laputta, Bogalay and Moulmyingyun. Large scale plantations were subsequently started in 1990. Plantations established by the Forestry Department often did not survive, as they were rapidly exploited by local communities. Community forestry mangrove plantations established in former mangrove areas appear to do much better. In Laputta Township, for example, 20 user groups have been formed and by 2003, 3 234 hectares of mangrove plantation had been established. Similarly, in Bogalay some 1 158 hectares, and in Moulmyingyun some 200 hectares of mangrove plantation had been established by 2003, bringing the total in Myanmar to almost 5 000 hectares (Maung, 2003).

Thailand

In Surat Thani, Lewis (2001) describes the restoration of 800 hectares of abandoned shrimp aquaculture ponds back to mangrove forests, being implemented by the Royal Forest Department. Calculation show that these forests can be restored for US$ 200 per hectare for hydrological restoration only (which according to Lewis may be sufficient), or US$700 per hectare is these areas are also replanted. Mangrove rstoration projects in Thailand have also been carried out by the private sector and by NGOs. For example, a pilot project working with local communities in the Pattani Bay area and carried out by the Prince of Songkla University and Wetlands International, replanted over 100 hectares of mangroves in areas degraded by logging for charcoal or abandoned after being used for intensive shrimp farming. Besides planting of mangroves, the project provided support for alternative income-generating initiatives, and helped increase environmental awareness and community organisation. Bamroongrugsa (2002) reports that the community forestry programmes in Songkla Lake were not very effective due to the lack of community participation and inadequate knowledge of reforestation techniques. Successful trials were carried out with bagged seedlings and propagules of *Rhizophora mucronata* and wild seedlings of *Sonneratia caseolaris,* which were protected from wave action by bamboo fencing.

Viet Nam

In Viet Nam, the primary goal of mangrove regeneration has been the rehabilitation of land devastated during the war (Tabuchi, 2003), although much of the damage to mangroves was apparently caused in the post-war period, by unbridled conversion of partly affected areas for aquaculture. Over a 20-year period (1977-1997), 20 638 hectares of degraded mangrove were rehabilitated in the Mekong Delta region (Tabuchi, 2003). However, at

[35] http://landbase.hq.unu.edu/Workshops/OkinawaMarch2000/Papers/Sogiertopapermar2000.htm

the same time much larger areas were converted to brackish water aquaculture, undoing most of the beneficial effects of mangrove restoration (see 5.3). Almost 1 000 hectares were also replanted in the mid-1990s in northern Viet Nam at Tiong Lang, Thai Thuy and Tinh Gio using *Bruguiera gymnorrhiza, Kandelia candel, Rhizophora stylosa* and *Sonneratia caseolaris* (Kogo & Kogo, 2004).

In the 1990s, about 6 600 hectares of former mangrove areas were restored in the Ca Mau peninsula, in a replanting programme together with five State Forestry/Fisheries Enterprises (Benthem et al., 1999). The main species used in this programme were Rhizophora apiculata and Sonneratia caseolaris, although other species were also used in trials, mainly in the Can Gio Forestry Enterprise. Hong (2004) found in restored areas in Can Gio (south of Ho Chi Minh City, near the Mekong Delta) that the current mangrove flora is similar to that of the early 1960s before widespread destruction with herbicide occurred. However, the individual numbers and distribution of species has changed significantly.

5.5 MANGROVES AND SEA LEVEL RISE

The Intergovernmental Panel on Climate Change (IPCC) forecasts a global sea level rise of 9-88 centimetres by 2100, and these changes are likely to affect mangrove habitats world-wide (Ellison, 2003). The supply of sediment at a particular locality will determine the ability of mangroves to keep up with sea level rise, and mangroves on low relief islands without rivers are likely to be most affected. Historically, the retreat of mangrove zones has also been demonstrated along the margins of mainland areas, for example, on the extensive coastal swamps of southern Papua (Ellison, 2003).

Mean sea levels in Southeast Asia are rising, and in Indonesia, for example, it is estimated to amount from 4.8 to more than 9 millimetres per year (BAPPENAS, 2004). The predicted sea level rise of 60 centimetres over the coming decades could lead to the destruction or severe degradation of 4.3 million hectares of vital coastal areas in Indonesia (BAPPENAS, 2004), including an estimated one million hectares of mangroves. This sea level rise may also affect most of the remaining mangroves in Indonesia, and likely also in the rest of Southeast Asia. Adaptation of mangrove vegetation to rising sea levels and a retreating coastline would only be possible in area where a flat landscape exists behind the mangroves, and where the back mangroves and the hinterland have not been converted to other land use types.

CHAPTER 6 IMPORTANT AND PROTECTED MANGROVE AREAS IN SOUTHEAST ASIA

6.1 MANGROVES IN THE PROTECTED AREA SYSTEM

Out of the total mangrove area remaining in Southeast Asia, almost 20 percent was incorporated into the region's protected area system by 2003 (Table 10). This is a large percentage, but one needs to be cautious as much of this consists of vast areas that are scarcely protected in the field.

TABLE 10
Mangroves in Protected Areas

Country	Protected Mangroves (ha)	% remaining mangroves in PA system ##	same, according to WRI *
Brunei Darussalam	7 533	41	4.7
Cambodia	31 100 *	48.8	66
Indonesia	783 400 *	26.7	33
Malaysia	10 900 *	1.9	7
Myanmar	12 500 **	2.9	0
Papua New Guinea	106 300 *	24.6	23
Philippines***	347 ***	unknown	0
Singapore	45	0	9
Thailand	25 600 *	10.5	5
Timor-Leste	0	0	-
Viet Nam	1 600 * 43 115 #	1.5 39	2
Total	959 700	19.6	

Sources:

* http://earthtrends.wri.org/text/forests-grasslands-drylands/variable-317.html
** http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1404_full.html
*** Figures for the Philippines are generally lacking ; earthtrends.wri lists protected mangroves as 'zero', while WCMC (http://www.wcmc.org.uk/marine/data/coral_mangrove/marine.maps.main.html) lists more than 120 marine protected areas – but data regarding mangrove cover is totally lacking. The National Biodiversity Strategy and Action Plan for the Philippines also lists at least 13 Protected Areas with mangroves, but data on mangrove cover is provided for two sites only, Bongsanglay Mangrove Reserve (164 ha) and Pujada Bay Protected Landscape and Seascape (183 ha) (pers. comm. Jim Berdach, 4 September 2004).

Tuan *et al.* (2001)
Spalding *et al.* (1997)

6.2 IMPORTANT MANGROVE AREAS

Southeast Asia's most important mangrove areas are briefly described below for each country, along with protected areas and locations designated as Ramsar sites. Ramsar site descriptions have been adapted from the Ramsar Database, at www.ramsar.org.

6.2.1 BRUNEI DARUSSALAM

Brunei's mangroves are found in the estuaries of its four main river systems: the Temburong, Belait, Tutong and Brunei-Muara. However, the status of these mangroves remains unclear. Forest reserves are under the jurisdiction of the Forestry Department, but mangrove outside these areas are in effect unprotected since the areas are simply classified as "State Land". The Integrated Management Plan for the Coastal Zone of Brunei recommended that 99 percent of the mangroves be protected. The plan proposed conversion of only 200 hectare, while 4 141 hectares were to be protected in national parks and 6 545 hectares were to be maintained for coastal protection. However, this plan was reportedly never implemented (in full) and mangrove clearance continues[36].

According to Iremonger *et al.* (1997), 800 hectares of mangrove are protected in Brunei Darussalam. However, according to Anderson & Marsden (1984) 7 533 hectares of mangroves in Brunei are located in the Selirong and Labu Forest Reserve, of which 2 566 hectares is located in the Selirong Recreational Reserve. Charles (2002) states that the status of Selirong was altered from forest reserve to conservation reserve to recreational reserve, and that it is now officially called Pulau Selirong Forest Recreational Park (pers. comm. Anthony Sebastian, 3 September 2004).

6.2.2 CAMBODIA

Mangroves are found scattered along much of Cambodia's coastline, but large and dense forests are found in the main estuarine areas of Peam Krasoap, Andong Tuk, Sre Ambel, Chak Sre Cham and the delta of Prek Kampot. Of the 85 100 hectares area reportedly occurring in 1992-1993, about 63 700 hectares was located in Koh Kong province alone, with 13 500 hectares in Sihanoukville and 7 900 hectares in both Kampot province and Kep Municipality (Sour, 2003).

Mangroves occur in three protected areas in Cambodia (Sour, 2003), namely Ream National Park, Peam Krasoap Wildlife Sanctuary and Batum Sakor National Park. Details on which acreage of mangrove is protected, however, is unavaiulable. Preah Sihanouk (Ream) National Park (21 000 ha) is covered by secondary, evergreen lowland forest, along with 'some mangrove forest'. Batum Sakor National Park (171 250 ha) has the only

[36] http://tracc.org.my/Borneocoast/MANGROVES/MANGROVE_LOSS.html

coastal *Dacrydium-Podocarpus* swamp forest in Cambodia. Peam Krasoap Wildlife Sanctuary (23 750 ha) is reportedly the most important mangrove forest in Cambodia and possibly the most extensive remaining within the Gulf of Thailand. Within the Peam Krasop Wildlife Sanctuary lies the Koh Kapik Ramsar Site, bescribed below.

Koh Kapik and Associated Islets Wildlife Sanctuary. This area was declared a Ramsar Site (No. 998) under the Ramsar Convention[37] on 23 June 1999. The total area is 12 000 hectares, and it is located at 11°28'N 103°04'E. It consists of alluvial islands immediately off the mainland of Koh Kong Province. Two major rivers flowing into the area bring a freshwater influence and create sand flats in some places. The site is mainly classified into two wetland types (Estuarine waters, and Intertidal mud, sand, or saltflats). The remaining relatively-intact mangroves are said to have assumed increased importance in providing nursery and feeding grounds for various invertebrate species since the substantial removal of mangrove forests in nearby Thailand. The area of the site is state-owned and lies within the Peam Krasop Wildlife Sanctuary, established in 1993.

6.2.3 INDONESIA

Indonesia reportedly had a total of 30 marine conservation areas in 1995 with a combined area of 2.8 million hectares (Moosa *et al.*, 1996).[38] This has grown substantially since then, and statistics of the Forestry Department indicate that this had increased to 4.63 million hectares by 2002[39]. While some of these protected areas have substantial tracts of mangrove forest, it is unclear which area of mangrove forest this network protects. According to RePPProT (1990; cited by Ministry of Forestry & FAO, 1990) a total of 603,000 hectares of mangroves were gazetted as Conservation Area or Nature Reserve by 1989, and 633 000 hectares as Protection Forest[40]. In 1995 there were 41 officially protected (i.e. gazetted) areas throughout Indonesia that harbour at least some mangrove habitat, and the total area of 'protected' mangrove officially stood at 551 363 hectares.

Since then, the mangroves of Sembilang National Park in South Sumatra have also been gazetted, bringing the total to well over 600 000 hectares. This is equivalent to about one quarter of Indonesia's remaining mangroves and about 15 percent of Indonesia's former mangrove area. The figures are not consistent, however, and according to other sources within the Ministry of Forestry an area of 738 175 hectares of mangrove was protected by law by 1993, which is equivalent to about 17 percent of the original mangrove area in Indonesia (Abdullah *et al.*, 1993; *Kompas:* May 5, 1993).

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[37] Convention on Wetlands of International Importance, especially for Waterfowl; convened in Ramsar, Iran, in 1971.

[38] The Development Plan of Marine Conservation in Indonesia lists 251 marine conservation areas, including 20 marine national parks, with a total area of 6.5 million hectares (Moosa *et al.*, 1996).

[39] http://www.dephut.go.id/INFORMASI/STATISTIK/Stat2002/PHKA/Iii1202.pdf

[40] This does not include figures for Java, which were not included in the RePPProT study; however, the total mangrove area in Java is not very significant.

There are two premier mangrove reserves in Indonesia, namely Sembilang National Park in South Sumatra and Bintuni Bay Strict Nature Reserve in Papua. Both of these are described in more detail below. Other sites are briefly described in the island (-group) description.

Sumatra

Apart from large stands of mangrove in Sembilang National Park, reasonable mangrove areas are included in Karang Gading Langkat Timur Laut Wildlife Reserve (North Sumatra) and Hutan Bakau Pantai Timur Laut Wildlife Reserve (Jambi). The former largely consists of secondary forest and abandoned brackish water fishponds, while the second forms a narrow green-belt along much of the coast of Jambi Province. However, both are very important in maintaining large populations of (migratory) waders, storks and ibises (Giesen, 1994). There are a few small islands with protected mangrove (e.g. Pulau Berkeh and Pulau Burung, Riau), but once again these are of importance to water birds, and have not been set aside as representative examples of mangrove habitat. Small remnants of mangrove forest remain in Way Kambas National Park (Lampung Province), where they are mainly located along tidal creeks, with some pioneer mangrove flats near the mouth of the Wako River; however, the mangrove belt lining tidal creeks is often very narrow.

Sembilang National Park. The 200 000 hectares Sembilang National Park (SNP) was gazetted in 2003 and is located in the delta of the Sembilang-Banyumasin-Musi rivers. It includes some of the most extensive mangroves in all of Southeast Asia, along with significant areas of mudflat, freshwater swamp forest and peat swamp forest. In combination with the adjacent Berbak National Park in Jambi Province, the combined wetland ecosystem covers more than 350 000 hectares of peatswamp forest, freshwater swamp forest and mangroves in Jambi and South Sumatra provinces. Along the Sembilang coast, there is an up to 15-18 kilometre wide belt of mangrove forests and mudflats, which forms an important wintering territory for as much as 150 000 migratory birds, and a spawning and nursery site for fish and shrimps. The whole area is considered as one of the most important water bird areas of the whole Indo-Malayan region. About 35 globally endangered species occur inside the Park's borders, including Sumatran tiger *Panthera tigris,* clouded leopard *Neofelis nebulosa*, sun bear *Helarctos malayanus,* milky stork *Mycteria cinerea,* lesser adjutant *Leptoptilos javanicus* and Asian dowitcher *Limnodromus semipalmatus*. The area also includes a large colony of the endangered milky stork *Mycteria cinerea*[41]. The SNP mangroves are the second largest contiguous mangrove area in Southeast Asia, after those in Bintuni Bay, Papua.

Kalimantan

In Kalimantan, perhaps more than 15 000 hectares of protected mangroves occurred in Gunung Palung National Park and Muara Kendawangan

[41] Taken from leaflet on the SNP, produced by the Indonesian Forestry Department, Local Government of South Sumatra, and Wetlands International (undated).

Wildlife Reserve (both in West Kalimantan) and Tanjung Puting National Park (Central Kalimantan). There have, however been unconfirmed reports of loss of mangroves in these reserves due to encroachment and illegal logging. Remaining 'protected' mangroves elsewhere in Kalimantan are either small and largely disturbed (Pulau Kaget, Pulau Kembang both South Kalimantan), or are being degazetted because of widespread logging (Kutai National Park in East Kalimantan, Pleihari Tanah Laut, South Kalimantan). All remaining large areas of mangroves in Kalimantan, in the Kapuas delta in West Kalimantan, and in the deltas of the Mahakam in East Kalimantan, either have been logged, or are currently undergoing logging.

Java

Mainland Java has lost more than 90 percent of its mangroves and little of this habitat is included in the current protected area system. The largest gazetted 'mangrove' area in Java (reportedly of 1 700 ha; Forestry Statistics, 2002) is located on Pulau Penaitan, an island off the western coast of West Java. However, this is clearly based on mis-identification of the well-developed *Terminalia catappa-Barringtonia asiatica* beach forests, which are very common on Penaitan. Hoogerwerf's (1951) survey map shows a total area of 250-300 hectares of mangrove, with about two-thirds located around Legon Lentah. During surveys in August 1996, mangroves were found in the vicinity of Legon Sabini only, and this was estimated as being less than 100 hectares. Other important areas are Pulau Dua and Pulau Rambut, two tiny islands off the north coast of West Java. These islands are of primary importance as breeding and roosting sites for many species of water bird (Silvius *et al*., 1987). About 1 000 hectares of mangrove occur on the northern and northeastern shores of Ujung Kulon National Park (Hommel, 1987).

The Segara Anakan Lagoon, located on the south coast of Central Java near Cilacap, consists of a central lagoon surrounded by mangrove swamps and recently accreted intertidal land that has partially been converted into rice fields. The central lagoon has remaining surface area of about 1 700 hectares, and there are about 12 230 hectares of mangrove forests of which only about 5 600 hectares remains in slightly to moderately disturbed conditions (Abubakar *et al*., 2001). The lagoon is one of the few remaining wetland areas in the region and offers roosting and nesting places for resident and migratory birds, including the endangered milky stork, *Mycteria cinerea* (pers. comm. R. Dudley, June 2000). Mangroves are dominated by *Avicennia, Rhizophora* and *Sonneratia,* and especially *Sonneratia alba.* This area was proposed as a reserve in the early 1980s, but a combination of conservation and sustainable use is now considered the best option because of heavy development pressures (White *et al*., 1989).

Sulawesi

A total of about 7 000 hectares of mangrove have been officially gazetted in Sulawesi, which is about 8 percent of the mangrove area still occurring in 1990, or about 2.5 percent of the island's former mangrove area. However, little remains of these officially gazetted mangroves. Surveys in South

(Giesen, *et al.,* 1991) and Southeast Sulawesi in 1989-90 revealed that virtually all of the 2 000 hectares of the Lampuko-Mampie reserve (South Sulawesi), and most of the 3 000 hectares of mangroves of Watumohae Hunting Reserve (Southeast Sulawesi), have been felled and converted to brackish water fish ponds. Mangroves of northern Bone Bay (23 000 ha) and the Lariang-Lumu plains (7 800 ha), both in South Sulawesi, were proposed for conservation, for example, in a proposed reserve north of the Lariang River (Giesen *et al.*, 1991) that would include 5 400 hectares of mangrove. However, both areas have since largely been converted for ponds, roads and agriculture.

Lesser Sundas

The mangroves of the Lesser Sunda islands (Nusa Tenggara) are probably well represented by the 3 000 hectares currently included in the Protected Area System, in Komodo National Park and Pulau Menipo Wildlife Reserve. Mangroves have never been that extensive in this part of Indonesia and the current remaining area of about 25 000 hectares represents about two-thirds of the former area. On Sumba Island, Indonesia, mangroves are often the only forest in an otherwise savanna-like landscape (Zieren *et al.,* 1990).

Moluccas

About 14 000 hectares of mangroves have been gazetted in the Moluccas, in Manusela National Park (Ceram, 3 000 ha), Yamdena Nature Reserve (Tanimbar, 10 000 ha) and Pulau Baun Wildlife Reserve (Aru islands, 1 000 ha). This would seem a reasonable representation of this habitat, although for biodiversity conservation, it would be best to gazette further mangrove areas both in the Kei and Aru Islands.

Papua

Large mangrove areas, totalling perhaps as much as 600 000 hectares, have been gazetted in Papua Province, in the Lorentz National Park (total area 300 000 ha), on Pulau Kimaam (about 165 000 ha) in Wasur National Park (6 180 ha) and at Bintuni Bay Nature Reserve (120 000 ha). To date, however, only Wasur and Bintuni are actively managed, and both Kimaam and Lorentz are 'paper reserves', protected by their remoteness alone. Pulau Dolok (Kimaam) lies off the southwestern coast of Papua, and is separated from the mainland by a narrow channel. Pulau Kimaam was gazetted in July 1978 with a total area of 600 000 hectares, of which 165 000 hectares reportedly consists of mangrove forest dominated by *Avicennia, Sonneratia* and *Rhizophora* species. The island is an internationally important site for migratory waterfowl, with species such as Mongolian plover *Charadrius mongolus*, large sand plover *Charadrius leschenaultii*, whimbrel *Numenius pharopus*, red-necked stint *Calidris ruficollis* and eastern curlew *Numenius madagascarensis* all recorded in large numbers.

Teluk Bintuni Nature Reserve: Bintuni Bay or Teluk Bintuni comprises a 450 000 hectares bay located on the western side of the Bird's Head peninsula of Papua. Bintuni Bay consists of a large sheltered bay, bordered by intertidal mudflats, sandbars and extensive mangrove areas. Mangroves

extend over 440 000 hectares, representing perhaps 25 percent of Indonesia's remaining mangrove area, and making this the second largest mangrove area in Asia (after the Sundarbans in Bangladesh-India). The mangrove belt at Bintuni attains a width of more than 30 kilometres at some points and stands of very mature mangrove occur. The mangrove forest is backed at many places by a five kilometre-wide *Nypa* palm zone, which is locally followed by freshwater swamp forests. Tropical lowland rainforest continues inland from the freshwater swamp zone.

Mangroves of the northern part of Bintuni Bay have been designated 'protection forest' (hutan lindung), while a 120 000 hectares Strict Nature Reserve has been established at the far eastern part of the bay and is largely untouched[42]. Most of the southern and southeastern part of the bay is included in a mangrove logging concession held by PT. Bintuni Utama MWI. Erftemeijer *et al.* (1989) identified four main mangrove associations: a) pioneering *Avicennia* forest, b) maturing *Avicennia-Sonneratia* forest, c) *Rhizophora-Bruguiera* forests, and d) *Nypa* forest. The pioneering *Avicennia* forest is dominated by *Avicennia marina,* and locally also by *Avicennia eucalyptifolia,* together with *Sonneratia alba* and *Aegiceras corniculatum.* The maturing *Avicennia-Sonneratia forest* is dominated by *Avicennia marina* and *Sonneratia caseolaris,* together with *Aegiceras corniculatum, Avicennia officinalis, Nypa fruticans, Rhizophora mucronata* and *Xylocarpus granatum. Rhizophora-Bruguiera* forests are dominated by *Rhizophora mucronata, R. apiculata, R. stylosa, Bruguiera parvifolia* and *B. gymnorrhiza,* along with *Ceriops tagal, Avicennia alba, Aegiceras corniculatum* and *Xylocarpus moluccensis. Nypa fruticans* forests usually occur as dense stands of this palm, together with an occasional *Xylocarpus granatum* or *Sonneratia caseolaris.*

6.2.4 MALAYSIA

The total area of mangrove forest gazetted in reserves and protected areas in Malaysia is unclear. Information dating from the mid-1990s suggest that not more than about 5-10 percent of the country's mangroves were incorporated in protected areas[43]. According to statistics of 1993, there were 5 670 hectares of gazetted mangrove conservation areas in Malaysia. Also, the Malaysian Cabinet, in late 1996, directed that all mangrove swamps within 400 metres of the coastline be left intouched to check escalating erosion.[44]

According to other reports (Wetlands International - Asia Pacific, 1996), 446 000 hectares of Malaysian mangrove have been gazetted in forest reserves and protected areas, of which the vast majority is found in forest reserves in Sabah (316 460 hectares or 71 percent of the total). Sarawak has much larger mangrove areas than Peninsular Malaysia, but most of this (131 000 out of 168 000 hectares in 1993) is not protected in forest reserves.

[42] http://nature.org/wherewework/asiapacific/indonesia/work/art13456.html

[43] http://earthtrends.wri.org/text/forests-grasslands-drylands/variable-317.html

[44] http://www.wetlands.org/capacity/WW/past/wwvol-2/feature/iss10/feature.htm

Of the 92 000 hectares of mangrove forest reserves in Pensinsular Malaysia, almost half (>40 000 hectares or 44%) is located in the Matang Mangrove Forest Reserve in Perak. However, it should be noted that mangroves in forest reserves are not protected, but are as a rule used as production forest and logged on a 20-30 year cycle. Forest reserves have also been converted for other uses (see Sungai Pulai, below).

According to TRACC[45], it has been suggested that a minimum of 5 percent of mangroves (30 000 ha) in Malaysia should be conserved as National Parks or other forms of protected areas. Progress towards this aim has been made, especially in Sarawak where approximately 2 500 hectares of mangroves are formally protected within various national parks and another 10 000 hectares are in the process of being gazetted.

More than 100 marine protected areas are listed in Malaysia by WCMC[46], but the extent to which mangroves occur within these reserves is not recorded, either in this list or in the Malaysia Wetland Directory (MCF, 1987), as both record mangrove presence and total reserve area only. According to the World Resources Institute[47], less than 12 000 hectares are included in the country's Protected Area system. A few of the more well known ones are listed here, including the accessible Kuala Selagor Nature Park in Peninsular Malaysia, and three Malaysian Ramsar Sites. The 40 000 hectares Matang Forest Reserve is primarily a production forest (see 4.3), but is also important from the point of biodiversity.

Kuala Selangor Nature Park: The Park is situated at the mouth of Selangor River, in the state of Selangor, Peninsular Malaysia, some 75 kilometres from Kuala Lumpur. It extends over approximately 240 hectares of mangroves and mudflats and is the home to various wildlife such as smooth otters *Lutra perspicillata* and monkeys (long-tailed macaques *Macaca fascicularis* and silvered leaf monkeys *Trachypithecus aurata*). More than 140 species of birds have been sighted, including Nordman's greenshank *Tringa guttifer* and the mangrove pitta *Pitta megarhyncha*. The park is also involved in a milky stork *Mycteria cinerea* reintroductory programme. Fireflies inhabit the nearby *Sonneratia* trees lining the Selangor River near Kampong Kuatan, and form a night time attraction for tourists.

Pulau Kukup State Park: This area was declared a Ramsar Site (No. 1287) under the Ramsar Convention on 31 January 2003. The total area is 647 hectares, and it is located in JohoreState at 01°19'N 103°25'E.. It consits of an uninhabited mangrove island located 1 kilometre from the southwestern tip of the Malaysian peninsula – one of the few intact sites of this type left in Southeast Asia. Pulau Kukup has been identified by BirdLife International as one of the Important Bird Areas (IBA) for Malaysia. Pulau Kukup is important for flood control, physical protection (e.g. as a wind-

[45] http://tracc.org.my/Borneocoast/MANGROVES/MANGROVE_LOSS.html

[46] www.wcmc.org.uk/marine/data/coral_mangrove/marine.maps.main.html

[47] www.earthtrends.wri.org

breaker), and shoreline stabilization. It also supports an important shellfish and cage culture industry, and has significant potential for ecotourism.

Sungai Pulai Forest Reserve: This area was declared a Ramsar Site (No. 1288) under the Ramsar Convention on 31 January 2003. The total area is 9 126 hectares, and it is located in Johore State at 01°23'N 103°32'E. It is the largest riverine mangrove system in Johore State, located at the estuary of the Pulai River. With its associated seagrass beds, intertidal mudflats and inland freshwater riverine forest the site represents one of the best examples of a lowland tropical river basin, supporting a rich biodiversity dependent on mangrove. It is home for the uncommon mangrove tree *Avicennia lanata*. Although this area has been demarcated as a reserve forest, parts have lately been given way to conversion for land related development programs such as development of new port, aquaculture, charcoal-making industry as well as residential area for supporting the newly developed industries (Hashim & Kadir, 1999).

Tanjung Piai State Park: This area was declared a Ramsar Site (No. 1289) under the Ramsar Convention on 31 January 2003. The total area is 526 hectares, and it is located in Johore State at 01°16'N 103°31'E. The site consists of coastal mangroves and intertidal mudflats located at the southernmost tip of continental Asia, especially important for protection from sea-water intrusion and coastal erosion. Tanjung Piai supports many threatened and vulnerable wetland-dependent species, classified as vulnerable or near threatened listed in the IUCN Red Book 2000. Waters of the four main rivers traversing Tanjung Piai are abundant with commercially valuable species. The site enjoys the status of a State Park for Ecotourism.

Klias Wetland – Sabah. Located about 120 kilometres from Kota Kinabalu on the Klias Peninsula are the Klias Wetlands, extending over an area of about 8 700 hectares (DWNP, 1987). This Mangrove Forest Reserve is reportedly rich with river wildlife and birds, including proboscis monkeys, long-tailed macaques, silver leaf monkeys and a wide variety of birds.

Cowie Bay – Sabah. Extending from the Kalimantan border up to Tawau in the north, with mangroves covering an area of 39 018 hectares and gazetted as Tawau Mangrove Forest Reserve (DWNP, 1987). Sabah's oldest and largest prawn farm is located in this area. The mangrove are also exploited commercially. The forest is composed of *Rhizophora apiculata, R. mucronata, Bruguiera parviflora* and *Ceriops tagal* with an intermixture of *Excoecaria* and *Avicennia.*

Sepilok, Sandakan Bay, Sabah. The mangrove forest of the Sandakan Bay area covers approximately 45 000 hectares, and is regarded as the largest area of accessible mangrove in Sabah.[48] Together with the adjacent Tambisan coast

[48] http://www.eaga.org.bn/eaga/forestry/MENU/Menu%20Malaysia.htm

to the southeast, this extends over a total area of about 150 000 hectares (DWNP, 1987), which includes freshwater swamps on the landward side of the mangrove. The area is important for Storm's stork *Ciconia stormi,* lesser adjutant *Leptoptilos javanicus,* proboscis monkey *Nasalis larvatus,* silvered leaf monkey *Trachypithecus aurata* and Bornean gibbon *Hylobates mulleri.*

Pulau Bruit, Sarawak. Extending over an area of 40 000 hectares, this low-lying island has extensive mudflats and mangrove forests on the northern and western shores. The northern area area of 1 776 hectares around Tanjong Sirik has been proposed as a national park. A visitor during migration may record 10 000 waders, 14 000 terns, 500 egrets and 20 lesser adjutants, although numbers, especially of waders, have fallen recently[49].

Rajang delta, Sarawak. An extensive delta system is located at the mouth of the Batang Rajang, the largest river in Malaysia. The central delta area is a complex mangrove and *Nypa* system, with further accreting mangroves and extensive mudflats at the northern end of Pulau Bruit. A substantial part of the Rajang mangroves are clear-felled in rotation for wood-chips. The three most important parts of the delta are the Matu-Daro and Sibu Swamp Forests, Pulau Bruit and the Rajang Mangrove Forest.[50] The Rajang Delta is particularly important for herons and egrets, migratory shorebirds and terns; over 20 000 shorebirds of at least 25 species and 14 000 terns of seven species utilise the area at certain times. The most abundant shorebirds are common redshank *Tringa totanus,* Terek's sandpiper *Xenus cinereus* and great sand plover *Charadrius leschenaultii*. Several uncommon species such as Swinhoe's egret (or Chinese egret) *Egretta eulophotes,* Asian dowitcher *Limnodromus semipalmatus* and Far-Eastern curlew *Numenius madagascariensis* have been reported at Pulau Bruit. Reptiles include the river monitor *Varanus salvator* and estuarine crocodile *Crocodylus porosus*. The latter breeds in the delta, but despite the abundance of suitable habitat, is now rare, presumably because of the harvesting of live hatchlings. Mammals include proboscis monkey *Nasalis larvatus,* silvered leaf monkey *Trachypithecus aurata (Presbytis cristata),* smooth otter *Lutra sumatrana,* leopard cat *Felis bengalensis* and wild boar *Sus barbatus*.

6.2.5 MYANMAR

According to Spalding *et al.* (1997) the largest mangrove areas are in the Irrawaddy (Ayeyarwady) Delta, but these were already heavily degraded in the early 1980s and the best mangroves were thought to occur in the northern state of Rakhine and in Tanintharyi, near the border with Thailand in the south. Maung (2003) reports that the most important mangrove areas in Myanmar still occur in the Irrawaddy Delta, but that other important mangrove areas also occur in coastal areas of Rakhine State and Tanintharyi Division.

[49] http://www.arbec.com.my/bos/location.htm

[50] http://www.arcbc.org.ph/arcbcweb/wetlands/malaysia/mys_rajangdelta.htm

'Protected' mangroves extend over 12 500 hectares and occur in three (proposed) protected areas in Myanmar[51], namely Letkokkon PA (400 ha), Kadonlay Kyun (100 ha) and Meinmahla Kyun (12 000 ha). All three sites occur in the Irrawaddy Delta, and are described in the *Directory of Asian Wetlands* (Scott, 1989), from which the following descriptions have been adapted. Meinmahla Kyun is an estuarine island located in the mouth of the Bogale and Kadonkani rivers, and is almost entirely comprised of sediments from the Bogale River. The island is almost entirely covered with mangrove forest, but has been logged in the past, and much of the forest is degraded. Meinmahla was designated a Reserved Forest since 1895, a status that has been proposed for upgrading to that of Wildlife Reserve.

Kadonlay Kyun is a small, flat, lowlying island of 260 hectares, and like Meinmahla it has been formed out of deposits from the Bogale River. About 100 hectares consists of (degraded) mangrove, while the rest primarily consists of grassland. The island has been proposed as a wildlife sanctuary, as it is an important breeding site for sea turtles, especially olive Ridleys *Lepidochelys olivacea,* loggerhead *Caretta caretta,* green turtle *Chelonia mydas* and leatherback *Dermochelys coriacea.*

Letkokkon consists of a group is small islands and mudflats formed by deposits from the China Bakir River, extending over a total area of about 388 hectares. How much of this consists of mangrove is unclear: while the World Wildlife Fund website reports of 400 hectares of mangrove, Scott (1989) reports that the principal vegetation consists of 'extensive reedbeds, with low scrub colonising areas above the high tide mark'.

Few recent reports exist on these areas, other than that the mangroves are generally 'in a sorry state'.

6.2.6 PAPUA NEW GUINEA

Papua New Guinea mangroves are found along extensive lengths of the country's coastline. There are several disjunct sections along the north coast, including adjacent to the mouths of the Sepik and Ramu rivers, and Dyke Ackland Bay and Ward Hunt Strait. The longest and deepest stretches of mangroves are found on the south side of the island, especially at the mouths of the Purari, Kikori, Fly, Northwest, and Otakwa rivers. On the Pacific (northern) coast of mainland Papua and the smaller islands (New Britain, New Ireland) many smaller mangroves areas occur on less exposed coasts. These mangroves, such as found along the northern coast of West New Britain Province (see Figure 4B), are often rich in plant species, with several mangrove species that are endemic to the eastern part of Southeast Asia, such as *Cerbera floribunda* and *Myristica hollrungii.*

[51] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im1404_full.html

Although 24 percent of the country's mangroves are listed as 'protected', it is generally acknowledged that PNG lacks a protected area system that is representative of its diverse habitats, and urgently requires specific conservation interventions[52].

Tonda Wildlife Management Area: Tonda was declared a Ramsar Site (No. 591) under the Ramsar Convention on 16th March 1993. The total area is 590 000 hectares, and it is located in Western Province at 08°45'S 141°23'E. It is also a Shorebird Network Site. It mainly consists of flat, coastal plains subject to seasonal, freshwater flooding. The site, bordering Indonesia, includes tidal river reaches, mangrove areas, grassland, and savannah woodlands. It is an important wetland for over 250 species of resident and migratory waterbirds and as a refuge during drought. Most of the world population of little curlew *Numenius minutus* stage on the plains during migration. Tonda Wildlife Management Area has been declared a Wildlife Management Area under the Fauna Protection and Control Act. The Act allows the local Management Area Committees (consisting of local landowners) to set rules regulating the taking of various species and restricting access to certain areas. In the case of Tonda, rules allow for the issue of licences for the taking of certain species, restrict the use of shotguns, regulate the size and sex of fauna taken, and determine the areas where hunting is allowed.

6.2.7 PHILIPPINES

The *Directory of Asian Wetlands* (Scott, 1989) lists 63 wetland sites, of which 30 had mangrove habitats with an unspecified area. However, most of this information is outdated, and given the rate of mangrove conversion since the 1980s, many of these may no longer exist. According to Spalding *et al.* (1997), the largest remaining areas are located to the south of the archipelago, on Mindanao and Samar, and also on Palawan in the west.

The Philippines has more than 120 marine reserves (see WRI website[53]), although it is unknown how extensive mangroves are in this system. The National Biodiversity Strategy and Action Plan for the Philippines lists at least 13 Protected Areas that include mangrove habitat, but data on mangrove area is provided for two sites only, Bongsanglay Mangrove Reserve (164 ha) and Pujada Bay Protected Landscape and Seascape (183 ha; Jim Berdach, pers. comm., 4 September 2004). The Philippines has four Ramsar Sites, of which two are freshwater and only one includes protected mangrove habitat, namely Olango Island.

Olango Island Wildlife Sanctuar: The area was declared a Ramsar Site (No. 656) under the Ramsar Convention on 1 July 1994. The total area is 5 800 hectares, and it is located in Cebu at 10°16'N 124°03'E; it is also a Shorebird Network Site. It mainly consists of a low-lying island surrounded by

[52] http://www.solutions-site.org/artman/publish/article_44.shtml

[53] See http://www.wcmc.org.uk/marine/data/coral_mangrove/marine.maps.main.html

extensive intertidal sandflats, mangroves, seagrass beds, coral reefs and islets. It is one of the most important areas in the country for significant numbers of migratory waterbirds, providing habitat for staging, wintering, roosting and feeding birds.

6.2.8 SINGAPORE

Mangrove forest cover has been reduced from an estimated 13 percent of Singapore Island in the 1820s to only 0.5 percent of the total land area at present. Mangrove forest is now found only in small patches with the largest areas in the northern part of the main island and on Pulau Tekong, Pulau Ubin and Pulau Semakau. Singapore has a remaining mangrove area of about 500 hectares, and of this about 9 percent are conserved in two protected areas:

- *Sungai Buloh Nature Park*, which extends over 87 hectares including vistor's area, trails, ponds and about 40 hectares of mangrove; and
- *Pasir Ris Nature Park*, which extends over about 70 hectares and includes about 5 hectares of mangrove[54]

In addition there are interesting remnants of mangrove at Mandai Besar/Kechil, Lim Chu Kang, Kranji, Sungei Pandan, Sungei Punggol, Pulau Tekong and Pulau Ubin.

6.2.9 THAILAND

According to WRI[55], about 25 000 hectares or 15 percent of the remaining mangroves are protected in Thailand. Both figures have changed considerably over the past years and are not very reliable. According to the 2002 statistics of the Royal Forest Department[56] (figures are from 2000), the provinces with the largest remaining mangrove areas are Phang Nga (45 500 ha), Satun (35 300 ha), Krabi (35 000 ha), Trang (33 500 ha) and Ranong (25 300 ha). These are all along the west coast of peninsular Thailand, the area affected by the recent (26 December 2004) devastating tsunami. Some of the most important mangrove sites are designated as Ramsar sites and described below.

Gulf of Thailand: This is large area of intertidal mudflats around the shores of a huge, shallow bay forming the estuary of four major rivers, the Mae Klong, Tachin, Chao Phraya and Bang Pakong. The area formerly supported extensive mangroves. While the largest areas have now been cleared for aquaculture and salt pans, much secondary mangrove still remains and is usually found as a narrow (10-l00m) fringe along the seaward margins. Extensive areas of low scrub are found in the brackish marshes along the landward edge. In places, the open shrimp ponds and salt pans extend two to three kilometres inland and, together with the offshore mudflats, provide an important feeding and roosting area for

[54] http://mangrove.nus.edu.sg/guidebooks/text/1016.htm

[55] http://earthtrends.wri.org/text/forests-grasslands-drylands/variable-317.html

[56] www.forest.go.th/stat/stat.htm

many thousands of shorebirds. The human population density is extremely high, and there is an increasing amount of heavy industry, especially extending eastwards from Bangkok along the lower reaches of the Chao Phraya River. Mangroves are usually dominated by *Rhizophora* species, with *Nypa fruticans* along banks and in the understorey. Extensive degraded areas are dominated by the mangrove fern *Acrostichum aureum*. Large areas of "back mangrove" are dominated by scrub formations grading into *Typha* marsh[57].

Don Hoi Lot: Don Hoi was declared a Ramsar Site (No. 1099) under the Ramsar Convention on 5 July 2001. The total area is 87 500 hectares, and it is located in Samut Songkhram Province at 13°21'N 099°59'E. It forms a rare type of natural wetland for Thailand, comprising sandbars at the mouth of the Mae Klong river with a vast area of intertidal mudflats, and an extremely productive location for the Hoi Lot (*Solen regularis*), an economically important mollusc unique to this region. Mangroves are present along the shoreline on the east side.

Had Chao Mai Marine National Park - Ta Libong Island Non-Hunting Area - Trang River Estuaries: This area was declared a Ramsar Site (No. 1182) under the Ramsar Convention on 14 August 2002. The total area is 66 313 hectares, and it is located in Trang Province at 07°22'N 099°24'E. It consists of three connected wetland ecosystems with riverine, estuarine, and coastal wetlands, including mangroves and *Nypa*, sand beach and rocky marine shores, mud flats, coral reefs and seagrass beds.

Kaper Estuary - Laemson Marine National Park - Kraburi Estuary: This area was declared a Ramsar Site (No. 1183) under the Ramsar Convention on 14 August 2002. The total area is 122 046 hectares, and it is located in Ranong Province at 09°36'N 098°39'E. The area has been declared a UNESCO Biosphere Reserve, and includes the largest concentration of mangrove forest remaining in the country and said to be one of the most extensive in the Indo-Pacific region, the site also includes *Nypa* forests, mud flats, sandy beaches, coral reefs, and seagrass beds.

Krabi Estuary National Reserve Forest: Krabi was declared a Ramsar Site (No. 1100) under the Ramsar Convention on 15 July 2001. The total area is 21 299 hectares, and it is located in Krabi Province at 07°58'N 098°55'E. The reserve consists of an area of sand beach, mangroves, and mudflats, with some steep wooded cliffs and intertidal mudflats extending up to 2 kilometres offshore at low tide. An area of mangroves and mudflats extending from the rocky headland of Khao Laem Nang, east past the complex of rivers which open to the sea at Pak Nam Krabi, to the Khlong Yuan and Khlong Taling Chan, and south to Ban Laem Hin. A complex of rivers open to the sea within the site, and extensive seagrass beds are

[57] http://www.arcbc.org.ph/arcbcweb/wetlands/thailand/tha_gultha.htm

present at Sriboya Island. Most mangrove areas were forest concession, but were converted to conservation areas in 2001.

Mu Koh Ang Thong Marine National Park: The area was declared a Ramsar Site (No. 1184) under the Ramsar Convention on 14 August 2002. The total area is 10 200 hectares, and it is located in Surathani Province at 9°37'N 99°41'E. The area consists of a complex of 42 small islands in the Gulf of Thailand, including sandy beaches, rocky cliffs, coral reefs, and young mangrove forests.

Pang Nga Bay Marine National Park: Pang Nga was declared a Ramsar Site (No. 1185) under the Ramsar Convention on 14 August 2002. The total area is 40 000 hectares, and it is located in Pang Nga Province at 8°17'N 98°36'E. The area consists of a shallow bay with 42 islands, comprising shallow marine waters and intertidal forested wetlands, with at least 28 species of mangrove; seagrass beds and coral reefs are also present.

6.2.10 TIMOR-LESTE

Mangroves extend over only about 3 000 hectares in Timor-Leste, as natural circumstances are not conducive for the establishment of this habitat. Along most of the southern coastline, the sea is too dynamic, few sediments accumulate, and the coast is too rocky. Mangroves in the south therefore occur only at the mouths of the streams, and in adjacent marshy or swampy terrain. On the north coast, however, the sea is calmer and mangroves are found along wider areas such as in Metinaro, Tibar and Maubara.

6.2.11 VIET NAM

Hong (1993, 2003) recognises four mangrove zones in Viet Nam, each with varying conditions:

i. *The Northeast Zone* (Quang Ninh Province): 39 400 hectares in 1982; 22 949 hectares in 1999. Low winter temperatures limits the growth of certain species, although 15 true mangrove species have been recorded. Coastal mudflats are shielded by a number of islands, and as a result they are little affected by storms or strong winds. A typical region is Mui Chua cape and Tien Yen estuary, where *Bruguiera gymnorhiza-Rhizophora stylosa-Avicennia marina-Kandelia candel* mangroves can reach a height of about 8 metres.
ii. *The Northern Delta Zone*: 7 000 hectares in 1982; 20 842 hectares in 1999. This is the area formed by accretion of sediments from the Thai Binh and Hong (Red) rivers. Although the mudflats are large and rich in alluvium and freshwater, this zone is subjected to strong winds, storms and waves. Also, as winter temperatures are low, mangrove stands are not extensive and the trees are relatively small. Mangroves are mainly found in sheltered parts of the estuaries of these two rivers, and are dominated by *Sonneratia caseolaris, Kandelia candel* and *Aegiceras corniculatum.*

iii. *The Central Zone:* 14 300 hectares in 1982; 3 000 hectares in 1999. The coastline along this area is rocky, surrounded by deep sea, and is influenced by strong wave action. As a result there are no mangroves along the seashore, although limited areas occur along river banks and in estuaries of small rivers.
iv. *The Coast of Southern Viet Nam:* 191 800 hectares in 1982; 102 497 hectares in 1999. Mangroves in this area occur in two main river systems: the Dong Nai River and the Cuu Long (Mekong) River. Conditions here are most favourable for mangrove development, because of higher temperatures, abundant sediments and fresh water, and the proximity of Indonesia and Malaysia, which have the highest level of mangrove species diversity.

According to Spalding *et al.* (1997), the largest areas of mangrove are in the Mekong Delta and further south on the Ca Mau Peninsula. Tuan *et al.* (2001) list 22 existing coastal and marine protected areas in Viet Nam, which altogether protect 43 115 hectares of mangrove habitat, or according to them, 39 percent of the remaining mangroves. Some of the most important sites are described below.

Dat Mui Nature Reserve (also known as Ca Mau cape or Mui Ca Mau) is the southernmost tip of Viet Nam. The area's mangroves suffered badly during the war, but have recovered well since then, due to a combination of rapid accretion of sediments, natural regeneration and rehabilitation. The area is gazetted as a Nature Reserve since 1983 (or 1986, according to Tuan *et al.*, 2001), extending over an area of 4 453 hectares.

Hon Mun Marine Protected Area, established in 2001, includes coral reef, mangroves and seagrass ecosystems. It is located near Nha Trang, Khanh Hoa province, South Viet Nam, and covers about 12 000 hectares, including 8 islands. There is a population of 5 000 people on the islands living in 7 villages.

The *Can Gio* mangrove forest was destroyed thoroughly during the war, but due to rehabilitation efforts it is now one of the country's best mangrove areas. The area was recognised as a Nature Reserve in 1990, and as a UNESCO Biosphere Reserve on 21 January 2000. The Managed Nature Reserve extends over 42 630 hectares and lies in the Mekong Delta, near Ca Mau.

Xuan Thuy Natural Wetland Reserve: Xuan Thuy was declared a Ramsar Site (No. 409) under the Ramsar Convention on 20 September 1988. The total area is 12 000 hectares, and it is located in Nam Ha at 20°10'N 106°20'E. 7 686 has has been gazetted as a Strict Nature Reserve since 1995. The area consists of delta and estuary islands supporting the last significant remnants of coastal mangrove and mudflat ecosystems in the Red River Delta; includes land enclosed by sea dikes, with fringing marshes.

CHAPTER 7 MANGROVE STUDIES: POINTS FOR BEGINNERS

7.1 IMPORTANT REFERENCES

Those wanting to study mangroves in greater detail should consult some of the classic references in this field that deal with mangroves in a broad way, such as MacNae (1968), Chapman (1976a), Saenger *et al.* (1983), and Mastaller (1997). Serious students of botany should refer to Tomlinson's (1986) classic tome, augmented by Duke *et al.* (1984) and Duke (1992). Van Steenis (1958) provides a general introduction to mangroves, as a foreword to Ding Hou's (1958) paper on the Rhizophoraceae for Flora Malesiana.

Country-wide publications on mangrove vegetation and flora (limited to 'true mangrove' species) exist for Malaysia (Watson, 1928), Thailand (Aksornkoae, 1993), Viet Nam (Hong & San, 1993), the Philippines (Aragones *et al.*, 1998) and Papua New Guinea (Percival & Womersley, 1975). A general introduction to the mangroves of Indonesia is provided in Part Two of *The Ecology of the Indonesian Seas* (Tomascik *et al.*, 1997), while chapters on mangroves of Sumatra and Sulawesi are provided by Whitten *et al.* (1984, 1987). Part of the present publication has appeared in much condensed form in an Indonesian translation (Noor *et al.*, 1999).

7.2 FIELD TRIP BASICS

Basic mangrove studies require little more than an identification guide, binoculars, pencil-and-paper and a bit of time and endurance. As the mangrove environment is rather hot, wet, muddy and often teeming with mosquitoes, clothing and equipment need to be adapted. Best is cotton clothing, with long sleeves and trousers to avoid scratches and prevent mosquito bites – it is advisable to bring a waterproof repellant. Write in pencil (HB), as notebooks are likely to get damp and ink will run. As many trips to mangroves will involve boat trips, the use of a hat and/or sun block/cream is advisable. A small, collapsable umbrella can be helpful to keep both sun and rain off your back, and is useful for photography in the

rain. Normal cameras will not survive a dip in a saline pool, so waterproof containers are much recommended. Binoculars are of no use if they also have to remain in containers, so these should be waterproof, or cheap enough to run the risk of their being spoiled by moisture and/or fungus.
All gear should preferably fit into a single bag, and a small backpack is usually handy, as this will free both hands when clambering among mangrove roots and simultaneously looking at the canopy for flowering specimens. Remember to bring plenty of drinking water, as mangrove field trips are usually thirsty affairs. Timing a trip is also important, as high water levels make boat travel easier, but impede observations of soil, infauna (animals living in the soil), and root types (important diagnostic characteristics for mangrove tree species).

Very practical advice for beginners is also provided by the *Shorebird Studies Manual* (Howes, 1989), which is still highly useful in spite of its age, and still commercially available.

7.3 MANGROVE PLANT SPECIMENS

Identification

Compared to studying Indonesian lowland forests, the study of mangrove vegetation is relatively easy, as the number of species is limited and flowering is often not very seasonal. This means that there are usually one or two specimens of each species in fruit and flower, making identification a simpler task. In addition, the vegetation is not as tall as lowland forest, and the observer does not need to stare up at a canopy of 40+ metres height. However, mangrove trees appear very similar in many of their vegetative characteristics: having leaves that are dark green, elliptic to obovate, medium-sized, of the laurel type but rather coriaceous and slightly fleshy.

What the observer should therefore focus on are the differences in bark, root types (stilts, pneumatophores, aerial roots), stipules, leaf insertion and flowers/fruit.

People are often inclined to simply browse through the drawings of a guidebook to find a picture that matches the specimen that they want to identify. This might work out well for the smaller plant groups and the moderately large, but highly diverse plant groups (such as the palms and ferns groups in this book), but often not for the larger or more complicated groups. An accurate identification can best be obtained by using the identification keys provided in this book.

These keys were designed in such a way so that the most obvious vegetative characteristics come out first. This will in most cases enable people without training in botany identify the species in question.

The most obvious characteristic of a plant is its general appearance: whether it is a tree or shrub, a herb, a grass (or sedge), a climber or a fern. For herbs and ferns, it is important to look whether the plant is growing on trees or shrubs (i.e. they are epiphytes), or whether it is growing directly on the surface/soil. Several mangrove trees and shrubs have very specific respiration roots, such as aerial roots, knee roots or pencil-shaped roots. These root types are an easy and important characteristic to identify many mangrove taxa, and can readily be observed, even on young trees.

Looking at the leaves is the next step. Compound leaves can usually easily be distinguished from simple leaves, but certain species – such as *Xylocarpus* – may lead to confusion at times. When in doubt, it is usually a good idea to check out a new leaf that is developing from a bud. It is usually obvious whether leaves are opposite or not (to avoid confusion, no distinction is made in this publication between alternate and spirally arranged insertion), but one should not be confused by bunches of leaves apparently randomly grouped at the end of a branch. It that case it is better to observe young, newly developing branches where leaf arrangement mey be clearer.

Stipules – small leaflets at the base of a leaf stalk – are also important for idenfication. These leaflets[58] are often shed, but if this has heppened they will have left a characteristic scar on the twigs. Leaf shapes are often used in the key, in particular the shape of the leaf tip (apex). It is recommended that persons interested in using the guide for identification familiarise themselves with the names of some of the most common leaf shapes.

The calyx (≅outer leaflets of a flower) of several mangrove trees remain more or less persistant on the fruit, and provide a good determination characteristic. Some trees have a white or colored latex or resin in the leaves and/or bark. This can be a handy characteristic for identification. However, one should be careful with this, since most of these resins are poisonous and irritating. Also, we do not want to encourage the slashing of the bark of trees for the sole purpose of identification.

Herbarium

It is always best to try to identify the species in the field, using a guidebook such as this one. If pressed for time, you can take plant specimens with you for later identification in the lab or at home – remember to take notes about site, location, date, trunk type, bark, habit and root type! Plant specimens are best kept folded between newspaper in a plant press (two perforated plywood boards of about 25 by 35 centimetres will do). Without further treatment, pressed specimens will keep for about 2-3 days, after which decay and fungal growth will set in; in many cases, 2-3 days is probably long enough for 'identification-at-leisure'. If you want to preserve specimens for a longer time, they should be dried in an oven - usually this can be

[58] Instead of small leaflets, stipules may also consist of small, leafy sheaths that enclose buds of new leaves.

improvised with a box over a low fire, separated by a thin metal sheet. Oven-dried specimens will last one to several months, depending on the ambient humidity.

Herbariums treat their specimens with 'sublimate' (Mercuric oxide), which will allow you to preserve specimens for decades, but this process has its disadvantages as this chemical is highly toxic. If you need to preserve specimens but cannot dry the plants (e.g. on a long boat trip), specimens can be preserved by keeping them in newspaper bound in cardboard, and keeping them in strong, waterproof, well-sealed plastic bags after drenching them with methylated spirits (= Schweinfurth method). Kept wet (in spirits), they will remain in a good condition for many months. The disadvantages are that methylated spirits may be fairly expensive if many specimens are to be collected (requires about 1-1.5 litre for a pile of about 25-35 specimens); in addition, spirits are highly inflammable and they evaporate easily through even the smallest perforation.

7.4 FLORA STUDIES

For studying any kind of vegetation, it is always wise to first obtain good topographic and thematic maps. General, large-scale maps indicating the location of mangroves are available in Spalding *et al.* (1997; now somewhat outdated), and at the UNEP-WCMC website[59]. A smaller and less accurate version of the Southeast Asian part of the latter is appended in Annex 2. Along with maps, remote sensing images are the most useful tool for someone wanting to conduct vegetation studies. Remote sensing images, in their broadest sense, can include photographs taken from the top of a hill or from the window of an aeroplane. More professional imagery is provided by commercial aerial photography (available via national mapping agencies such as BAKOSURTANAL in Indonesia, but this generally requires security clearances), radar imagery, and satelllite imagery.

Of the latter, Landsat and SPOT are most commonly available and used. Images are available directly via Landsat or SPOT websites[60], or via national agencies such as LAPAN in Indonesia (Indonesian Satellite Imagery Receiving Centre, Jakarta), the Bangkok Landsat receiving station, and SPOT headquarters in Toulouse, France. The choice of imagery type depends on the level of details needed for the survey. The present available satellite images can be used for a scale as large as 1:25 000 (for vegetation mapping), but for a larger scale aerial photographs are more suitable. Usually directly discernible on remote sensing imagery are the different vegetation zones within the mangrove belt – this simplifies the making of a draft map of a given site.

[59] http://www.unep-wcmc.org/index.html?http://www.unep-cmc.org/forest/global_map.htm~main

[60] www.Landsat.org or www.SPOT.com

A map produced on the basis of remote sensing imagery alone does not tell us very much, as ground data must be gathered, correlated to the image characteristics and entered into the legend of the map. Data on the vegetation requires identifying which species occur where. This involves elucidating which species occur together (in plant communities), and those which never occur toegther and may therefore be differentiating species.

The easiest way to do this is to describe vegetation transects in the mangrove vegetation; basically there are two transect types, namely line-intercept transects, and broad swathe transects. Line-intercept transects are the simplest: this involves laying out a line of given length (e.g. 100 m) in a discrete vegetation, and noting which plants (species and number of individuals) the line intercepts. Broad-swathe line (or belt) transects are similar, except that the line has a discrete width, of say 5 or 10 metres: all plants (species and number of individuals) in this broad swathe are then noted. Line transect data can later be compared with each other, either visually, or by means of specific computer programmes.

A remotely sensed image is interpreted and a preliminary map is drawn, based on image characteristics and terrain features, displaying land units with similar characteristics. After that, an adequate number of field samples are taken of each land unit, and the ground data is correlated to the remotely sensed data. Those field samples should not only consist of vegetation records, but soil samples and observations of other physical conditions, such as hydrology, as well. This will result in a land-ecological vegetation map with an integrated legend, clearly displaying the correlation between vegetation (-communities or -types) and physical factors. Mangrove vegetation may also be studied by analyzing quadrats, i.e. estimating the density of certain species in a given (small) area, e.g. a 10 by 10 metre square of vegetation. For obvious reasons, the quadrat method works best in herbaceous vegetation. These methods are described in detail by Mueller-Dombois and Ellenberg (1974), Chapman (1984) and English *et al*. (1994), and in Indonesian language by Kusmana (1997), to name a few examples.

7.5 FAUNA STUDIES

Many qualitative studies have been carried out on mangrove fauna in Southeast Asia, and a good account of the methodology is provided by Sasekumar (1984) and English *et al.* (1994). Studies focus on the zonation of mangrove fauna, faunal density & productivity, vertical distribution patterns (especially in relation to the tide), and soil in fauna. Techniques are generally quite simple, involving no more than sieving, netting, quiet observing and (often more than) a bit of patience. As a scientist involved with education, Lim (1995) regards mangroves as an ideal learning environment for students, both at tertiary and secondary levels, because of the simplicity of structure, and the sheer abundance coupled with a relatively low diversity of animal life. For the study of shorebirds, the volume by Howes (1989) is most

practical and unsurpassed, certainly for beginners. Part Two of *The Ecology of the Indonesian Seas* (Tomascik *et al.*, 1997) provides a good introduction to the fauna of Indonesian mangroves, with extensive species lists of the main faunal groups occurring throughout the archipelago.

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ANNEX 1 Table of Southeast Asian mangrove species

NOTE: *Numbers correspond with the species number as this is dealt with in part 2 of the mangrove guide.*

	FERNS		*Mangrove*	*Lifeform*	**Brunei**	**Cambodia**	**Indonesia**	**Malaysia**	**Myanmar**	**PNG**	**Philippines**	**Singapore**	**Thailand**	**Timor-Leste**	**Viet Nam**
No.	**Family**	**Scientific name**													
1	Aspleniaceae	*Asplenium macrophyllum*		f	+	+	+	+	+	+	+	+	+	+	+
2		*Asplenium nidus*		f	+	+	+	+	+	+	+	+	+	+	+
3	Blechnaceae	*Stenochlaena palustris*		f	+	+	+	+	+	+	+	+	+	+	+
4	Davalliaceae	*Davallia divaricata*		f			+	+	+				+		
5		*Davallia parvula*		f			+	+							
6		*Pachypleuria angustata*		f			+	+					+		
7	Grammitidaceae	*Ctenopteris moultoni*		f			+	+					+		
8	Hymenophyllaceae	*Hymenophyllum holochilum*		f		+	+	+		+			+	+	+
9	Lomariopsidaceae	*Elaphoglossum amblyphyllum*		f	+		+	+							
10	Lycopodiaceae	*Lycopodium carinatum*		f	+	+	+	+	+	+	+		+	+	+
11	Nephrolepidaceae	*Nephrolepis acutifolia*		f		+	+	+					+		+
12	Polypodiaceae	*Drymoglossum piloselloides*		f	+	+	+	+	+	+	+	+	+	+	+
13		*Drynaria rigidula*		f			+	+		+			+		
14		*Drynaria sparsisora*		f			+	+		+		+	+		
15		*Loxogramma involuta*		f			+								
16		*Myrmecophila sinuosa*		f			+	+		+			+		
17		*Photinopteris speciosa*		f		+	+	+		+	+		+		+
18		*Phymatodes scolopendria*		f	+	+	+	+	+	+	+	+	+	+	+
19		*Platycerium coronarium*		f	+		+	+	+			+	+		
20		*Pyrrosia longifolia*		f			+	+		+					
21		*Selliguea heterocarpa*		f			+	+					+		
22	Pteridaceae	*Acrostichum aureum*	M	f	+	+	+	+	+	+	+	+	+	+	+
23		*Acrostichum speciosum*	M	f	+	+	+	+	+	+	+	+	+	+	+
24	Vittariaceae	*Vittaria elongata*		f	+	+	+	+	+	+	+	+	+	+	+

	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
52	Acanthaceae	*Acanthus ebracteatus*	M	h	+	+	+	+	+	+	+	+	+		+
53		*Acanthus ilicifolius*	M	h	+	+	+	+	+	+	+	+	+	+	+
54		*Acanthus volubilis*	M	h		+	+	+	+	+		+	+		
55	Aizoaceae	*Sesuvium portulacastrum*		h		+	+	+	+	+	+	+	+	+	+
56		*Trianthema portulacastrum*		h			+	+		+	+		+	+	
57	Amaryllidaceae	*Crinum asiaticum*		h	+	+	+	+	+	+	+	+	+	+	+
140	Anacardiaceae	*Gluta velutina*		t	+		+	+	+				+		+
141	Apocynaceae	*Cerbera floribunda*		t			+			+					
142		*Cerbera manghas*		t	+	+	+	+	+	+	+	+	+	+	+
143		*Cerbera odollam*		t		+	+	+	+	+		+	+	+	+
144	Aquifoliaceae	*Ilex cymosa*		t	+		+	+			+	+	+		+
145		*Ilex maingayi*		t				+							
58	Araceae	*Colocasia esculenta*		h	+	+	+	+	+	+	+	+	+	+	+
59		*Cryptocoryne ciliata*		h	+		+	+		+			+		+
60		*Lasia spinosa*		h	+		+	+		+					+
146	Araliaceae	*Polyscias macgillivrayi*		t			+			+					
75		*Schefflera elliptica*		e			+	+			+	+	+		
76		*Schefflera lanceolata*		e				+				+			
77		*Schefflera ridleyi*		e				+				+			
131	Arecaceae	*Calamus erinaceus*		p(c)	+		+	+			+	+	+		
132		*Caryota urens*		p		+			+				+		
133		*Corypha saribus*		p		+	+	+			+		+	+	+
134		*Licuala spinosa*		p	+	+	+	+	+		+	+	+		+
135		*Nypa fruticans*	M	p	+	+	+	+	+	+	+	+		+	+
136		*Oncosperma tigillarium*		p	+	+	+	+	+		+	+	+		+
137		*Phoenix paludosa*		p		+	+	+	+						+
147	Asclepiadaceae	*Calotropis gigantea*		t (h)			+	+	+				+		
78		*Dischidia benghalensis*		e		+	+	+	+				+		+
79		*Dischidia nummularia*		e	+	+	+	+	+	+		+	+	+	+
80		*Dischidia rafflesiana*		e	+		+	+	+				+		+
103		*Finlaysonia obovata*		c		+	+	+	+			+	+		+
104		*Gymnanthera oblonga*		c		+	+	+		+	+		+		+
81		*Hoya parasitica*		e		+		+	+				+		+
105	Asclepiadaceae	*Oxystelma carnosum*		c			+	+		+	+				
106		*Sarcolobus carinatus*		c				+	+				+		
107		*Sarcolobus globosus*		c			+	+	+				+		+
148	Asteraceae	*Pluchea indica*		t (h)		+	+	+	+	+	+	+	+	+	+
149		*Pluchea pteropoda*		t (h)											+
108		*Wedelia biflora*		c (h)			+	+		+	+	+	+		+
150	Avicenniaceae	*Avicennia alba*	M	t	+	+	+	+	+	+	+	+	+		+
151		*Avicennia eucalyptifolia*	M	t			+			+	+				
152		*Avicennia lanata*	M	t			?+	+		+	+	+			+
153		*Avicennia marina*	M	t	+	+	+	+	+	+	+	+	+	+	+

	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
154		*Avicennia officinalis*	M	t		+	+	+	+	+	+	+	+	+	+
155	Batidaceae	*Batis argillicola*		t (h)			+			+					
156	Bignoniaceae	*Dolichandrone spathacea*		t	+	+	+	+	+	+	+	+	+	+	+
157	Bombaceae	*Camptostemon philippinense*	M	t			+				+				
158		*Camptostemon schultzii*	M	t			+			+					
159	Boraginaceae	*Cordia cochinchinensis*		t		+		+	+				+		+
160		*Cordia dichotoma*		t		+	+	+	+	+	+	+	+	+	+
161		*Cordia subcordata*		t		+	+	+		+	+		+	+	+
162	Casuarinaceae	*Casuarina equisetifolia*		t	+	+	+	+	+	+	+	+	+	+	+
163	Celastraceae	*Cassine viburnifolia*		t	+		+	+			+	+	+		
109		*Loeseneriella macrantha*		c	+		+	+		+		+			
164		*Maytenus emarginata*		t			+	+		+	+				
165		*Salacia chinensis*		t	+	+	+	+	+	+	+	+	+	+	+
61	Chenopodiaceae	*Halocnemum cinereum*		h			+			+					
62		*Salicornia indica*		h			+	+						+	
63		*Suaeda maritima*		h			+			+			+		+
166	Chrysobalanaceae	*Atuna racemosa racemosa*		t	+		+	+		+	+	+	+		
110	Combretaceae	*Calycopteris floribunda*		c(t)		+		+	+				+		
111		*Combretum tetralophum*		c(t)	+	+	+	+		+		+	+	+	+
112		*Combretum trifoliatum*		c(t)	?	+	+	+	+	+			+		+
167		*Lumnitzera littorea*	M	t		+	+	+	+	+	+	+			+
168		*Lumnitzera racemosa*	M	t	+	+	+	+	+	+	+	+	+	+	+
169		*Terminalia catappa*		t	+	+	+	+	+	+	+	+	+	+	+
64	Convolvulaceae	*Ipomoea gracilis*		h		+	+	+			+	+			
65		*Ipomoea maxima*		h			+	+	+			+	+	+	+
66	Convolvulaceae	*Ipomoea pes-capre*		h	+	+	+	+	+	+	+	+	+	+	+
67		*Ipomoea tuba*		h	+	+	+	+	+	+	+	+	+	+	+
138	Cycadaceae	*Cycas rumphii*		p	?	?	+	+	+	+	+	?	+	+	+
25	Cyperaceae	*Cyperus compactus*		g	+	+	+	+	+	+	+	+	+	+	+
26		*Cyperus javanicus*		g	+	+	+	+	+	+	+	+	+	+	+
27		*Cyperus malaccensis*		g	+	+	+	+	+	+	+	+	+		+
28		*Cyperus scariosus*		g			+			+					
29		*Cyperus stoloniferous*		g	+	+	+	+	+	+	+	+	+	+	+
30		*Eleocharis dulcis*		g	+	+	+	+	+	+	+	+	+	+	+
31		*Eleocharis parvula*		g		+	+								
32		*Eleocharis spiralis*		g			+	+		+	+	+			
33		*Fimbristylis cymosa*		g	+	+	+	+	+	+	+	+	+	+	+
34		*Fimbristylis ferruginea*		g	+	+	+	+	+	+	+	+	+		+
35		*Fimbristylis polytrichoides*		g	+		+	+		+	+				
36		*Fimbristylis sericea*		g	+	+	+	+	+				+		
37		*Fimbristylis sieberiana*		g			+				+			+	
38		*Scirpus grossus*		g	+	+	+	+	+	+	+	+	+		+
39		*Scirpus lacustris*		g						+	+				+

	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
40		*Scirpus litoralis*		g			+			+	+				
41		*Scirpus maritimus*		g						+	+				
170	Ebenaceae	*Diospyros ferrea*		t		+	+	+	+	+	+		+		+
171		*Diospyros malabarica*		t		+	+	+	+				+		
172		*Diospyros maritima*		t			+		+		+				
82	Ericaceae	*Rhododendron brookeanum*		e	+		+	+							
173	Euphorbiaceae	*Blumeodendron tokbrae*		t			+	+		+					
174		*Croton heterocarpus*		t	+			+	+		+	+			
175		*Excoecaria agallocha*	M	t	+	+	+	+	+	+	+	+	+	+	+
176		*Excoecaria indica*		t	+	+	+	+	+	+		+	+	+	+
177		*Glochidion littorale*		t		+	+	+			+	+	+		+
178		*Ricinus communis*		t	+	+	+	+	+	+	+	+	+	+	+
179	Flacourtiaceae	*Scolopia macrophylla*		t	+	+	+	+					+		+
113	Flagellariaceae	*Flagellaria indica*		c	+	+	+	+	+	+	+	+	+	+	+
180	Gentianaceae	*Fagraea crenulata*		t			+	+				+	+		+
181	Goodeniaceae	*Scaevola hainanensis*		t											+
182		*Scaevola taccada*		t	+	+	+	+	+	+	+	+	+	+	+
183	Guttiferae	*Calophyllum inophyllum*		t	+	+	+	+	+	+	+	+	+	+	+
184	Hernandiaceae	*Hernandia ovigera*		t	?	+	+	+		+	+		+	+	+
185	Icacinaceae	*Merrilliodendron megacarpum*		t			+			+	+				
186		*Stemonurus ammui*		t			+			+					
114	Lauraceae	*Cassytha filiformis*		c(e)	+	+	+	+	+	+	+	+	+	+	+
187	Lecythidaceae	*Barringtonia acutangula*		t	+	+	+	+	+	+			+		+
188		*Barringtonia asiatica*		t	+	+	+	+		+	+	+	+		+
189		*Barringtonia conoidea*		t	+		+	+	+			?+			
190		*Barringtonia racemosa*		t	+	+	+	+	+		+	+	+		+
115	Leguminosae	*Abrus precatorius*		c	+	+	+	+	+	+	+	+	+	+	+
116		*Aganope heptaphylla*		c	+		+	+		+	+				
117		*Caesalpinia bonduc*		c	+	+	+	+	+	+	+	+	+	+	+
118		*Caesalpinia crista*		c	+	+	+	+	+	+	+	+	+	+	+
68		*Canavalia maritima*		h	+	+	+	+	+	+	+	+	+	+	+
191		*Cathormion umbellatum*		t			+						+	+	
192		*Cynometra iripa*		t			+	+	+		+		+		
193		*Cynometra ramiflora*		t	+		+	+	+	+	+	+	+	+	
119		*Dalbergia candenatensis*		c	+		+	+			+	+	+		+
120		*Dalbergia menoeides*		c			+								
194		*Derris pinnata*		t (c)			+	+	+		+				
121		*Derris scandens*		c					+						
122		*Derris trifoliata*		c	+	+	+	+	+			+	+		+
123		*Entada phaseoloides*		c			+			+	+				+
195		*Erythrina orientalis*		t			+	+	+					+	+
196		*Inocarpus fagifer*		t			+	+		+					
197		*Intsia bijuga*		t	+	+	+	+	+	+	+	+	+	+	?

	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
124		*Mucuna gigantea*		c			+	+	+		+		+		+
198		*Peltophorum pterocarpum*		t	+		+	+		+	+	+	+	+	+
199		*Pongamia pinnata*		t	+	+	+	+	+	+	+	+	+	+	+
200		*Serianthes grandiflora*		t	+	?	+	+		+	+	+			
201		*Sindora siamensis var. maritima*		t		+							+		+
125	Lophopyxidaceae	*Lophopyxis maingayi*		c			+	+		+					
83	Loranthaceae	*Amyema anisomeres*	M	e			+								
84		*Amyema gravis*	M	e			+	+							
85		*Amyema mackayense*	M	e			+								
86	Loranthaceae	*Dendrophthoe pentandra*		e			+	+	+		+	+	+		+
87		*Macrosolen cochinchinensis*		e	+	+	+	+	?		+	+	+		?
88		*Viscum ovalifolium*		e	+	+	+	+	+	+	+	+	+	+	+
202	Lythraceae	*Pemphis acidula*	M	t			+	+			+	+	+		
126	Malpighiaceae	*Ryssopterys timoriensis*		c			+			+	+			+	
127		*Tristellateia australasiae*		c	+	+	+	+		+	+		+	+	+
203	Malvaceae	*Hibiscus tiliaceus*		t	+	+	+	+	+	+	+	+	+	+	+
204		*Thespesia populnea*		t	+	+	+	+	+	+	+	+	+	+	+
205	Melastomataceae	*Melastoma malabathricum*		t	+	+	+	+	+	+	+	+	+	+	+
206		*Melastoma saigonense*		t		+			+				+		+
207		*Ochthocharis bornensis*		t	+	+	+	+				(+)	+		
89		*Pachycentria constricta*		e	+		+	+	+			+			
208	Meliaceae	*Aglaia cucullata*		t	+		+	+	+	+	+		+		+
209		*Xylocarpus granatum*	M	t	+	+	+	+	+	+	+	+	+	+	+
210		*Xylocarpus moluccensis*	M	t		+	+	+	+	+	+	+	+		+
211		*Xylocarpus rumphii*	M	t		+	+	+		+	+			+	
128	Menispermaceae	*Anamirta cocculus*		c		+	+		+	+	+		+		+
129		*Hypserpa polyandra*		c(t)			+			+				+	
212	Moraceae	*Ficus curtipes*		t		+	+	+	+				+		+
213		*Ficus microcarpa*		t			+	+		+	+		+		+
214	Myoporaceae	*Myoporum bontioides*		t											+
215	Myristicaceae	*Horsfieldia irya*		t	+	+	+	+	+	+	+	+	+		
216		*Myristica hollrungii*		t			+			+					
217	Myrsinaceae	*Aegiceras corniculatum*	M	t	+	+	+	+	+	+	+	+	+	+	+
218		*Aegiceras floridum*	M	t		+	+	+		+	+				+
219		*Ardisia elliptica*		t	+		+	+	+		+	+	+		
220		*Rapanea porteriana*		t	+		+	+					+		
221	Myrtaceae	*Melaleuca cajuputi*		t		+	+	+	+			+	+	+	+
222		*Osbornia octodonta*	M	t			+	+		+	+				
69	Najadaceae	*Najas browniana*		h			+			+					
70		*Najas indica*		h		+	+	+	+	+	+	+	+	+	+
71		*Najas marina*		h			+								
223	Olacaceae	*Olax imbricata*		t(c)	+	?	+	+	+	+	+	+	+	+	?
224		*Ximenia americana*		t	+	+	+	+	+	+	+	+	+	+	+

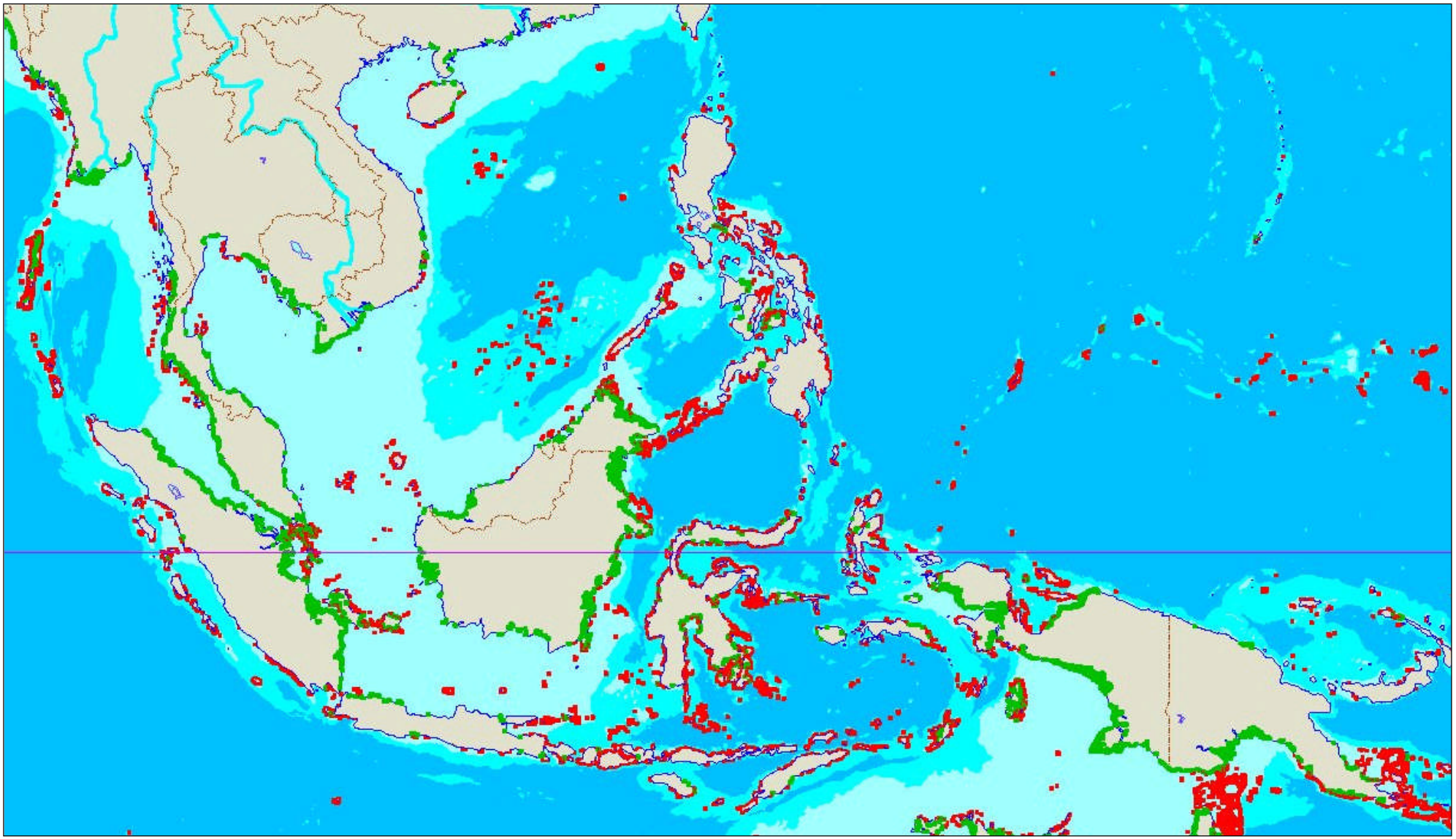
	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
90	Orchidaceae	*Aerides odoratum*		e			+	+	+		+		+		+
91		*Bulbophyllum xylocarpi*		e			+	+					+		
92		*Cymbidium finlaysonianum*		e	+	+	+	+			+	+	+		+
93		*Dendrobium aloefolium*		e	+		+	+		+				?	
94		*Dendrobium moschatum*		e					+				+		
95		*Dendrobium pachyphyllum*		e	+		+	+	+				+		
96		*Dendrobium subulatum*		e			+	+					+		
97		*Dockrillia teretifolium*		e			+			+				+	
98		*Oberonia iridifolium*		e			+	+							
99		*Oberonia laeta*		e			+	+				+			
100		*Oberonia rhizophoreti*	M	e			+	+							
139	Pandanaceae	*Pandanus tectorius*		p	+	+	+	+	+	+	+	+	+	+	+
72	Passifloraceae	*Passiflora foetida*		h(c)	+	+	+	+	+	+	+	+	+	+	+
225	Plumbaginaceae	*Aegialitis annulata*	M	t			+			+				+	
226		*Aegialitis rotundifolia*	M	t		+			+				+		
42	Poaceae	*Cynodon dactylon*		g	+	+	+	+	+	+	+	+	+	+	+
43		*Diplachne fusca*		g			+	+	+			+	+		
44		*Leptochloa neesii*		g	+		+	+	+			+	+		
45		*Myriostachya wightiana*		g		+	+	+	+				+		+
46		*Paspalum vaginatum*		g	+	+	+	+	+	+	+	+	+	+	+
47		*Phragmites karka*		g	+	+	+	+	+	+	+	+	+		+
48		*Sporolobus virginicus*		g	+	+	+	+	+		+	+	+		+
49		*Xerochloa imberbis*		g			+						+		
50		*Zoysia matrella*		g			+	+				+			
227	Podocarpaceae	*Podocarpus polystachyus*		t	+		+	+			+	+	+		
130	Rhamnaceae	*Smythea lanceata*		c	+		+	+		+		+			
228	Rhizophoraceae	*Bruguiera cylindrica*	M	t	+	+	+	+	+	+	+	+	+	+	+
229		*Bruguiera exaristata*	M	t			+			+				+	
230		*Bruguiera gymnorrhiza*	M	t	+	+	+	+	+	+	+	+	+	+	+
231		*Bruguiera hainesii*	M	t			+	+	+	+			+		
232		*Bruguiera parviflora*	M	t	+	+	+	+	+	+	+	+	+	+	+
233		*Bruguiera sexangula*	M	t	+	+	+	+	+	+	+	+	+	+	+
234		*Ceriops decandra*	M	t		+	+	+	+	+	+		+		+
235		*Ceriops tagal*	M	t	+	+	+	+	+	+	+	+	+	+	+
236	Rhizophoraceae	*Kandelia candel*	M	t	+	+	+	+	+		+	+	+		+
237		*Rhizophora apiculata*	M	t	+	+	+	+	+	+	+	+	+	+	+
238		*Rhizophora mucronata*	M	t	+	+	+	+	+	+	+	+	+	+	+
239		*Rhizophora stylosa*	M	t			+	+		+	+	+		+	+
240	Rubiaceae	*Gardenia tubifera*		t	+		+	+	+			+	+		+
241		*Guettarda speciosa*		t		+	+	+	+	+	+	+	+	+	+
101		*Hydnophytum formicarum*		e	+		+	+							+
242		*Ixora timorensis*		t			+							+	

	HIGHER PLANTS		*Mangrove*	*Lifeform*	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	PNG	Philippines	Singapore	Thailand	Timor-Leste	Viet Nam
No.	**Family**	**Scientific name**													
243		*Morinda citrifolia*		t	+	+	+	+	+	+	+	+	+	+	+
102		*Myrmecodia tuberosa*		e	+		+	+		+	+				
244		*Scyphiphora hydrophyllacea*	M	t	+	+	+	+		+	+	+	+		+
73	Ruppiaceae	*Ruppia maritima maritima*		h			+	+			+		+		+
245	Rutaceae	*Acronychia pedunculata*		t	+		+	+					+		+
246		*Atalantia monophylla*		t		+		+	+		+		+		
247		*Merope angulata*		t			+		+	+		+			
248	Salvadoraceae	*Azima sarmentosa*		t		+	+	+	+				+		+
249	Sapindaceae	*Allophyllus cobbe*		t	+	+	+	+		+		+	+	+	
250		*Mischocarpus sundaicus*		t			+	+			+	+	+		+
251	Sapotaceae	*Planchonella obovata*		t		+	+	+		+		+	+		+
252	Simaroubaceae	*Quassia harmandiana*		t		+							+		
253		*Quassia indica*		t	+	+	+	+	+	+	+		+		+
254	Sonneratiaceae	*Sonneratia alba*	M	t	+	+	+	+	+	+	+	+	+	+	+
255		*Sonneratia apetala*	M	t					+						
256		*Sonneratia caseolaris*	M	t	+	+	+	+	+	+	+	+	+	+	+
257		*Sonneratia griffithii*	M	t		+		+	+				+		
258		*Sonneratia ovata*	M	t		+	+	+		+	+	+	+		+
259	Sterculiaceae	*Heritiera fomes*	M	t					+						
260		*Heritiera globosa*	M	t	+		+	+							
261		*Heritiera litoralis*	M	t	+	+	+	+	+	+	+	+	+	+	+
262		*Kleinhovia hospita*		t		+	+	+	+	+	+		+		+
263	Symplocaceae	*Symplocos celastrifolia*		t	+		+	+		+	+	+	+		
264	Tiliaceae	*Brownlowia argentata*	M	t			+	+	+	+	+	+			
265		*Brownlowia tersa*	M	t	+	+	+	+	+		+	+	+		
51	Typhaceae	*Typha angustifolia*		g	+	+	+	+	+	+	+	+	+	+	+
266	Verbenaceae	*Clerodendrum inerme*		t		+	+	+	+		+	+	+		+
267		*Premna obtusifolia*		t		+	+	+	+	+	+		+	+	
74		*Stachytarpheta jamaicensis*		h		+	+	+	+	+	+	+	+	+	+
268		*Vitex ovata*		t(h)		+	+	+	+		+		+		
		TOTALs	**52**	**268**	**126**	**141**	**243**	**221**	**148**	**160**	**155**	**138**	**186**	**99**	**152**
		Lifeforms (totals):													
		Ferns (f)		24											
		Grasses &grass-like herbs (g)		27											
		Ground herbs (h)		23											
		Epiphytes (e)		28											
		Palms &palm-like species (p)		9											
		Climbers (c)		28											
		Trees &shrubs (t)		129											
				268											

NOTE: M in mangrove column = true mangrove species; i.e. occurring in mangrove habitat only

ANNEX 2 Map of Southeast Asian mangrove areas

The map is provided on the next page, with kind permission from WCMC.
Note that mangroves are indicated in green, coral reefs in red.



ANNEX 3 Index of scientific names

NOTE: Correct scientific names are given in **BOLD,** and the number added denotes the species number as this is dealt with in part 2 of the mangrove guide.

Aegianilites Presl.; see *Aegialitis annulata* R.Br.
Aegianilites rotundifolia; see *Aegialitis rotundifolia* Roxb.
***Aegiceras corniculatum* (L.) Blanco – 217**
Aegiceras ferreum Blume; see *Aegiceras floridum* Roemer & Schultes
***Aegiceras floridum* Roemer & Schultes – 218**
Aegiceras fragrans König; see *Aegiceras corniculatum* (L.) Blanco
Aegiceras majus Gaertn.; see *Aegiceras corniculatum* (L.) Blanco
Aegiceras malaspinaea A.DC.; see *Aegiceras corniculatum* (L.) Blanco
Aegiceras nigricans A. Rich.; see *Aegiceras floridum* Roemer & Schultes
Aegiphila viburnifolia Juss.; see *Cassine viburnifolia* (Juss.) Ding Hou
Aerides cornuta Roxb.; see *Aerides odoratum* Reinw. *ex* Blume
Aerides dayanum hort.; see *Aerides odoratum* Reinw. *ex* Blume
Aerides nobile Warn.; see *Aerides odoratum* Reinw. *ex* Blume
Aerides odoratum Lour.; see *Aerides odoratum* Reinw. *ex* Blume
***Aerides odoratum* Reinw. *ex* Blume – 90**
Aerides odoratum var. majus Ortgies.; see *Aerides odoratum* Reinw. *ex* Blume
Aerides rohanianum Rchb. f.; see *Aerides odoratum* Reinw. *ex* Blume
Aerides suavissimum Lindley; see *Aerides odoratum* Reinw. *ex* Blume
Aerides virens Lindley; see *Aerides odoratum* Reinw. *ex* Blume
Aerides wilsonianum R.H. Torr.; see *Aerides odoratum* Reinw. *ex* Blume
Afzelia bijuga A. Gray; see *Intsia bijuga* (Colebr.) Kuntze
Afzelia retusa Kurz.; see *Intsia bijuga* (Colebr.) Kuntze
***Aganope heptaphylla* (L.) Polhill – 116**
Agasta asiatica Miers.; see *Barringtonia asiatica* (L.) Kurz
Aglaia conduplifolia Elmer; see *Aglaia cucullata* (Roxb.) Pellegrin
***Aglaia cucullata* (Roxb.) Pellegrin – 208**
Aglaia tripetala Merr.; see *Aglaia cucullata* (Roxb.) Pellegrin
Aglaia zollingeri C.DC.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Agrostis matrella L.; see *Zoysia matrella* (L.) Merr.
Agrostis virginica L.; see *Sporobolus virginicus* (L.) Kunth.
Albizia grandiflora (Benth.) F. Muell.; see *Serianthes grandiflora* Bentham.
Allophylus amboinensis Blume; see *Allophylus cobbe* (L.) Raeusch.
Allopylus apiocarpus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus blancoi Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus cambessedei Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus celebicus Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus chlorocarpus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
***Allophylus cobbe* (L.) Raeusch. – 249**
Allophylus cobbe (L.) Raeuschel.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus dimorphus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus filiger Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus fulvinervis (Blume) Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus glaber Boerl.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus integrifolius Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus javensis (Blume) Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus leptococcus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus ligustrina Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus littoralis (Blume) Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus macrostachys Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus micrococcus Radlk.; see *Allophylus cobbe* (L.) Raeusch.

Allophylus quinatus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus rufescens Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus rugosa Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus sumatranus Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus sundanus Miq.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus ternatus Lour.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus timoriensis (DC.) Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus villosus (Roxb.) Blume; see *Allophylus cobbe* (L.) Raeusch.
Allophylus zeylanicus L.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus setulosus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Allophylus unifoliolatus Radlk.; see *Allophylus cobbe* (L.) Raeusch.
Alocasia dussii Hort.; see *Colocasia esculenta* (L.) Schott
Alocasia illustris W. Br.; see *Colocasia esculenta* (L.) Schott
Ambrosinia ciliata Roxb.; see *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott
Amoora aherniana Merr.; see *Aglaia cucullata* (Roxb.) Pellegrin
Amoora auriculata Miq.; see *Aglaia cucullata* (Roxb.) Pellegrin
Amoora cucullata Roxb.; see *Aglaia cucullata* (Roxb.) Pellegrin
Amoora naumannii sensu C.DC.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Amoora salomoniensis C. DC.; see *Xylocarpus granatum* Koen.
Amoora zollingeri (C.DC.) Koord.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Ampactus litorea Rumph.; see *Allophylus cobbe* (L.) Raeusch.
***Amyema anisomeres* Dans. – 83**
Amyema cycnei-sinus; see Amyema mackayense (Blakely) Danser
***Amyema gravis* Danser – 84**
***Amyema mackayense* (Blakely) Danser – 85**
Amyema mackayense ssp. *cycnei-sinus.; see Amyema mackayense* (Blakely) Danser
Amyris arborescens P. Browne; see *Ximenia americana* L.
***Anamirta cocculus* L. Wight & Arn. – 128**
Anamirta jucunda Miers.; see *Anamirta cocculus* L. Wight & Arn.
Andersonia cucullata Roxb.; see *Aglaia cucullata* (Roxb.) Pellegrin
Andropogon dulce Burm.; see *Eleocharis dulcis* (Burm. f.) Henschel
Antrophyum involutum Bl.; see *Loxogramma involuta* Presl.
Aporetica penicellata Blanco; see *Allophylus cobbe* (L.) Raeusch.
Aporetica ternata Forst. & Forst.; see *Allophylus cobbe* (L.) Raeusch.
Aquifolium indicum Rumph.; see *Acanthus ilicifolius* L.
Araiostegia davaricata (Blume) M. Kato; see *Davallia divaricata* Blume
Arbor glutinosa Rumphius; see *Cordia dichotoma* G. Forst.
Arbor ovigera Rumph.; see *Hernandia ovigera* L.
***Ardisia elliptica* Thunberg – 219**
Ardisia humilis Vahl.; see *Ardisia elliptica* Thunberg
Ardisia kotoensis Hayata; see *Ardisia elliptica* Thunberg
Ardisia littoralis Andr.; see *Ardisia elliptica* Thunberg
Ardisia squamulosa C. Presl.; see *Ardisia elliptica* Thunberg
Areca tigillaria Jack.; see *Oncosperma tigillarium* (Jack.) Ridl.
Arthrocnenum indicum (Willd.) Moq.; see *Salicornia indica* Willd.
Arum aegyptium Rumph.; see *Colocasia esculenta* (L.) Schott
Arum chinense L.; see *Colocasia esculenta* (L.) Schott
Arum colocasia L.; see *Colocasia esculenta* (L.) Schott
Arum colocasioides Desf.; see *Colocasia esculenta* (L.) Schott
Arum esculentum L.; see *Colocasia esculenta* (L.) Schott

Arum nymphaeifolia (Vent.) Roxb.; see *Colocasia esculenta* (L.) Schott
Arum peltata Lam.; see *Colocasia esculenta* (L.) Schott
Arundo karka Retz.; see *Phragmites karka* (Retz.) Trin. ex Steud.
Asclepias gigantea L.; see *Calotropis gigantea* (L) R.Br.
Asclepias parasitica Roxb.; see *Hoya parasitica* (Roxb.) Wall. *ex* Wight
Asplenium adiantioides C.Chr.; see *Asplenium macrophyllum* Sw.
Asplenium antiquum Makino; see *Asplenium nidus* Linn.
Asplenium australiasicum (J.Sm.) Hook.; see *Asplenium nidus* Linn.
Asplenium canaliculatum Bl.; see *Asplenium macrophyllum* Sw.
Asplenium falcatum Lamk.; see *Asplenium macrophyllum* Sw.
Asplenium filicifolium Goldm.; see *Asplenium nidus* Linn.
***Asplenium macrophyllum* Sw. – 1**
***Asplenium nidus* Linn. – 2**
Asplenium oxyphyllum Cuming.; see *Asplenium macrophyllum* Sw.
Asplenium pachyphyllum; see *Asplenium nidus* Linn.
Asplenium polyodon Forst.; see *Asplenium macrophyllum* Sw.
Asplenium simile Bl.; see *Asplenium macrophyllum* Sw.
***Atalantia monophylla* DC. – 246**
Atalantia spinosa Tanaka; see *Atalantia monophylla* DC.
Atriplex maritima (L.) Crantz.; see *Suaeda maritima* (L.) Dum.
Atuna alba Rumph.; see *Atuna racemosa ssp. racemosa* Rafin.
Atuna elata (King.) Kosterm..; see *Atuna racemosa ssp. racemosa* Rafin.
***Atuna racemosa ssp. racemosa* Rafin. – 166**
Atuna scabra (Hassk.) Kosterm.; see *Atuna racemosa ssp. racemosa* Rafin.
Aubletia caseolaris Gaertn.; see *Sonneratia caseolaris* (L.) Engl.
***Avicennia alba* Blume – 150**
***Avicennia eucalyptifolia* Zipp. ex Moldenke – 151**
Avicennia eucalyptifolia (Zipp. ex Miq) Moldenke; see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Avicennia intermedia Griff.; see *Avicennia marina* (Forssk.) Vierh.
***Avicennia lanata* Ridley – 152**
***Avicennia marina* (Forssk.) Vierh. – 153**
Avicennia marina (Forssk.) Vierh. *var. alba* (Blume) Bakh.; see *Avicennia alba* Blume
Avicennia marina subsp. eucalyptifolia (Zipp. ex Moldenke) J. Everett; see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Avicennia marina var. *acutissima* Stapf & Moldenke; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *anomala* Moldenke; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *australiasica* (Walp.) J. Everett; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. eucalyptifolia (Zip.. ex Moldenke) N.C. Duke; see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Avicennia marina var. *intermedia* (Griff.) Bakh.; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *marina*; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *resinifera* (Forst.) Bakh.; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *rumphiana* (Hall. f.) Bakh.; see *Avicennia marina* (Forssk.) Vierh.
Avicennia marina var. *typica* Bakhuizen; see *Avicennia marina* (Forssk.) Vierh.
Avicennia mindanaense Elmer; see *Avicennia marina* (Forssk.) Vierh.
***Avicennia officinalis* L. – 154**
Avicennia officinalis L., *Sceura marina* Forssk.; see *Avicennia marina* (Forssk.) Vierh.
Avincennia officinalis var. eucalyptifolia Valet.; see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Avicennia officinalis var. *spathulata* Kuntze; see *Avicennia lanata* Ridley
Avicennia rumphiana; see *Avicennia lanata* Ridley

Avicennia tomentosa Willd.; see *Avicennia officinalis* L.
Azalea brookeana Low *ex* Lindl.; see *Rhododendron brookeanum* Low ex Lindl. *var. brookeanum*
Azima nova Blanco; see *Azima sarmentosa* (Bl.) B. & H.
***Azima sarmentosa* (Bl.) B. & H. – 248**
Baccharis indica L.; see *Pluchea indica* (L.) Less.
Balanopteris minor Gaertn.; see *Heritiera littoralis* Dryand.
Balanopteris tothila Gaertn.; see *Heritiera littoralis* Dryand.
Bancudus latifolia Rumph.; see *Morinda citrifolia* L.
Banisteria dichotoma (*non* L.) Spanoghe; see *Ryssopterys timoriensis* (DC.) Jussieu
Banisteria timoriensis A.P. DC.; see *Ryssopterys timoriensis* (DC.) Jussieu
***Barringtonia acutangula* (L.) Gaertn. – 187**
Barringtonia acutangula subsp. *spicata* (Bl.) Payens; see *Barringtonia acutangula* (L.) Gaertn.
***Barringtonia asiatica* (L.) Kurz – 188**
Barringtonia butonica Forster; see *Barringtonia asiatica* (L.) Kurz
***Barringtonia conoidea* Griff. – 189**
Barringtonia edaphocarpa Gagn.; see *Barringtonia acutangula* (L.) Gaertn.
***Barringtonia racemosa* (L.) Spreng. – 190**
Barringtonia racemosa (L.) Bl. ex DC.; see *Barringtonia racemosa* (L.) Spreng.
Barringtonia rubra Blume; see *Barringtonia racemosa* (L.) Spreng.
Barringtonia speciosa J. R. & G. Forster; see *Barringtonia asiatica* (L.) Kurz
Barringtonia spicata Blume; see *Barringtonia acutangula* (L.) Gaertn.
Barringtonia stravadarium Blanco; see *Barringtonia racemosa* (L.) Spreng.
***Batis argillicola* van Royen – 155b**
Bignonia javanica Thunb.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Bignonia longiflora Willd. ex DC.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Bignonia longissima Lour.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Bignonia spathacea L.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Bintangur maritima Rumph.; see *Calophyllum inophyllum* L.
Bladhia kotoensis (Hayata) Nakai; see *Ardisia elliptica* Thunberg
Blatti acide Lamk.; see *Sonneratia caseolaris* (L.) Engl.
Blatti apetala O.K.; see *Sonneratia apetala* Buch.-Ham.
Blatti caseolaris O.K.; see *Sonneratia caseolaris* (L.) Engl.
Blatti pagatpat Niedenzu; see *Sonneratia caseolaris* (L.) Engl.
Blumeodendron elateriospermum J.J. Smith; see *Blumeodendron tokbrai* (Bl.) Kurz.
Blumeodendron paucinervium (Elm.) Merr.; see *Blumeodendron tokbrai* (Bl.) Kurz.
Blumeodendron tokbrai (Bl.) J.J. Smith; see *Blumeodendron tokbrai* (Bl.) Kurz.
***Blumeodendron tokbrai* (Bl.) Kurz. – 173**
Blumeodendron vernicosum (Hk. f.) Gage; see *Blumeodendron tokbrai* (Bl.) Kurz.
Brachypterum scandens W & A.; see *Derris scandens* (Aubl.) Pittier
Bromus polystachyos Forsk.; see *Diplachne fusca* (L.) Beauv.
***Brownlowia argentata* Kurz. – 264**
Brownlowia beccarii (Mast.) Pierre; see *Brownlowia tersa* (L.) Kosterm.
Brownlowia lanceolata Benth.; see *Brownlowia tersa* (L.) Kosterm.
Brownlowia lepidota; see *Brownlowia argentata* Kurz.
Brownlowia riedelii Hemsl.; see *Brownlowia argentata* Kurz.
***Brownlowia tersa* (L.) Kosterm. – 265**
Bruguiera angulata Griff.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera australis A. Cunn.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera capensis Bl.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Bruguiera caryophylloides Bl.; see *Bruguiera cylindrica* (L.) Bl.

Bruguiera conjugata (*non Rhizphora conjuga* L.) Merr.; see *Bruguiera gymnorrhiza* (L.) Lamk.
***Bruguiera cylindrica* (L.) Bl. – 228**
Bruguiera cylindrica (*non* Bl.) Hance; see *Bruguiera gymnorrhiza* (L.) Lamk.
Bruguiera cylindrica (*non Rhizophora cylindrica* L.) Bl.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera decandra Griff.; see *Ceriops decandra* (Griff.) Ding Hou
Bruguiera eriopetala W. & A. *ex* Arn.; see *Bruguiera sexangula* (Lour.) Poir.
***Bruguiera exaristata* Ding Hou – 229**
Bruguiera gymnorhiza (with one `r'); see *Bruguiera gymnorrhiza* (L.) Lamk.
***Bruguiera gymnorrhiza* (L.) Lamk. – 230**
***Bruguiera hainessii* C.G.Rogers – 231**
Bruguiera malabarica (*non* Arn.) F.-Vill.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera malabarica Arn.; see *Bruguiera cylindrica* (L.) Bl.
Bruguiera oxyphylla Miq.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera parietosa Griff.; see *Bruguiera sexangula* (Lour.) Poir.
***Bruguiera parviflora* (Roxb.) W.& A. *ex* Griff. – 232**
Bruguiera rheedii Bl.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Bruguiera ritchiei Merr.; see *Bruguiera parviflora* (Roxb.) W.& A. *ex* Griff.
Bruguiera rumphii Bl.; see *Bruguiera gymnorrhiza* (L.) Lamk.
***Bruguiera sexangula* (Lour.) Poir. – 233**
Bruguiera sexangularis Spreng.; see *Bruguiera sexangula* (Lour.) Poir.
Bruguiera wightii Bl.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Bruguiera zippelii Bl.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Buglossum litoreum Rumph.; see *Scaevola taccada* (Gaertn.) Roxb.
Bulbophyllum catenarium Ridl.; see *Bulbophyllum xylocarpi* J.J.Smith
Bulbophyllum ovalifolium Lindl. *sensu lato*; see *Bulbophyllum xylocarpi* J.J.Smith
***Bulbophyllum xylocarpi* J.J.Smith – 91**
Bupariti populnea (L.) Rothmaler; see *Thespesia populnea* (L.) Soland. ex Correa
Butonica rosata Miers.; see *Barringtonia racemosa* (L.) Spreng.
Butonica rumphina Miers; see *Barringtonia asiatica* (L.) Kurz
Butonica terrestris rubra Rumph.; see *Barringtonia racemosa* (L.) Spreng.
Cacara litorea Rumph.; see *Canavalia maritima* Thouars
Cacoucia lucida Hassk.; see *Combretum trifoliatum* Vent.
Cacoucia trifoliata DC.; see *Combretum trifoliatum* Vent.
Caesalpinia arborea Zoll. *ex* Miq.; see *Peltophorum pterocarpum* (DC.) K. Heyne
***Caesalpinia bonduc* (L.) Roxb. – 117**
Caesalpinia bonducella Flem.; see *Caesalpinia crista* L.
***Caesalpinia crista* L. – 118**
Caesalpinia jayabo Maza.; see *Caesalpinia bonduc* (L.) Roxb.
Caesalpinia laevigata Perr.; see *Caesalpinia crista* L.
Caesalpinia nuga L.; see *Caesalpinia crista* L.
Caesalpinia sogerensis Baker; see *Caesalpinia bonduc* (L.) Roxb.
Caju pinnatum O. Kuntze.; see *Pongamia pinnata* (L.) Pierre
Caladium colocasia W. Wight *ex saff.*; see *Colocasia esculenta* (L.) Schott
Caladum esculentum (L.) Vent.; see *Colocasia esculenta* (L.) Schott
Caladium nymphaeifolia Vent.; see *Colocasia esculenta* (L.) Schott
Caladium violaceum hort. *ex* Engl.; see *Colocasia esculenta* (L.) Schott
Calamus aquatilis; see *Calamus erinaceus* (Becc.) Dransfield
***Calamus erinaceus* (Becc.) Dransfield – 131**
Calla gaby Blanco; see *Colocasia esculenta* (L.) Schott
Callista carnosum; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.

Callista moschata Kuntze.; see *Dendrobium moschatum* (Buch.-Ham.) Sw.
Callista pachyphylla Kuntze.; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Callista pumila; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Callista teretifolia (Lindl.) Kuntze.; see *Dockrillia teretifolia* (R.Br.) Brieger
Calodium cocginchinensis Lour.; see *Cassytha filiformis* Linn.
Calonyction album House; see *Ipomoea tuba* Schlechtend.
Calonyction grandiflorum Choisy; see *Ipomoea tuba* Schlechtend.
Calonyction muticum Decaisne; see *Ipomoea tuba* Schlechtend.
Calonyction tuba; see *Ipomoea tuba* Schlechtend.
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Canavalia baueriana Endl.; see *Canavalia maritima* Thouars
Canavalia emarginata (Jacq.) G.Don.; see *Canavalia maritima* Thouars
Canavalia lineata Prain *non* DC..; see *Canavalia maritima* Thouars
Canavalia lineata (Thunb.) DC.; see *Canavalia maritima* Thouars
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Canavalia miniata (Kunth.) DC.; see *Canavalia maritima* Thouars
Canavalia moneta Welw.; see *Canavalia maritima* Thouars
Canavalia obcordata (Roxb.) Voigt.; see *Canavalia maritima* Thouars
Canavalia obtusifolia DC.; see *Canavalia maritima* Thouars
Canavalia podocarpa Dunn.; see *Canavalia maritima* Thouars
Canavalia rosea (Sw.) DC.; see *Canavalia maritima* Thouars
Canavali maritima; see *Canavalia maritima* Thouars
Capriola dactylon (L.) O.K.; see *Cynodon dactylon* (L.) Pers.
Carapa borneensis Becc.; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Carapa granatum (Koen.) Alston; see *Xylocarpus granatum* Koen.
Carapa indica A. Juss.; see *Xylocarpus granatum* Koen.
Carapa mekongensis (Pierre) Pellegr.; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Carapa moluccensis auct. non Lam.; see *Xylocarpus granatum* Koen.
Carapa moluccensis auct. non. Lam.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Carapa moluccensis Lam.; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Carapa obovata auct. non Blume; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Carapa obovata Blume; see *Xylocarpus granatum* Koen.
Carapa rumphii Kostel.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Carex tuberosa (non Degl.) Blanco; see *Eleocharis dulcis* (Burm. f.) Henschel
***Caryota urens* L. – 132**
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Cassytha aphylla (Forssk.) Raenschel.; see *Cassytha filiformis* Linn.

Cassytha archboldiana C.K. Allen; see *Cassytha filiformis* Linn.
Cassytha brasiliensis Mart. ex Nees.; see *Cassytha filiformis* Linn.
Cassytha dissitiflora Meisn.; see *Cassytha filiformis* Linn.
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Cassytha filiformis L. var. *subpubescens* Meisn.; see *Cassytha filiformis* Linn.
Cassytha guieenensis Schumach. & Thonn.; see *Cassytha filiformis* Linn.
Cassytha novoguieenensis Kaeh. & Harusima; see *Cassytha filiformis* Linn.
Cassytha timorensis Gand.; see *Cassytha filiformis* Linn.
Cassytha zeylanica Gaertn.; see *Cassytha filiformis* Linn.
***Casuarina equisetifolia* L. – 162**
Casuarina equisetifolia J.R. & G. Forst.; see *Casuarina equisetifolia* L.
Casuarina equisetifolia subsp. *equisetifolia*; see *Casuarina equisetifolia* L.
Casuarina equisetifolia subsp. *incana* (Benth.) L.A.S. Johnson; see *Casuarina equisetifolia* L.
Casuarina equisetifolia var. *equisetifolia*; see *Casuarina equisetifolia* L.
Casuarina equisetifolia var. *incana* Benth.; see *Casuarina equisetifolia* L.
Casuarina equisetifolia var. *microcarpa* F. Muell.; see *Casuarina equisetifolia* L.
Casuarina litorea L. ex Fosberg & Sachet; see *Casuarina equisetifolia* L.
Casuarina muricata Roxb.; see *Casuarina equisetifolia* L.
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Cattimarus Rumph.; see *Kleinhovia hospita* L..
Caulinia indica Willd.; see *Najas indica* (Willd.) Cham.
Celastrus emarginatus Willd.; see *Maytenus emarginata* (Willd.) Ding Hou
Celastrus montanus Roth.; see *Maytenus emarginata* (Willd.) Ding Hou
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Cerbera linneai Montr.; see *Cerbera manghas* L.
***Cerbera manghas* L. – 142**
Cerbera micrantha Kanehira; see *Cerbera floribunda* K. Schumann
Cerbera odallam Bl.; see *Cerbera manghas* L.
***Cerbera odollam* Gaertn. – 143**
Cerbera tanghina Hook.; see *Cerbera manghas* L.
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Ceriops australis White; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops boiviniana Tul.; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops candolleana Arn.; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops candolleana var. *sasakii* Hayata; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops candolleana var. *spathulata* Blume; see *Ceriops tagal* (Perr.) C.B.Rob.
***Ceriops decandra* (Griff.) Ding Hou – 234**
Ceriops forsteniana; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops lucida Miq.; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops pauciflora Benth.; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops roxburghiana Arn.; see *Ceriops decandra* (Griff.) Ding Hou
Ceriops somalensis Chiovenda; see *Ceriops tagal* (Perr.) C.B.Rob.
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Ceriops tagal var. *australis* White; see *Ceriops tagal* (Perr.) C.B.Rob.

Ceriops timoriensis Domin; see *Ceriops tagal* (Perr.) C.B.Rob.
Ceriops zippeliana Bl.; see *Ceriops decandra* (Griff.) Ding Hou
Chenopodina australis (R.Br.) Moq.; see *Suaeda maritima* (L.) Dum.
Chenopodina maritima (L.) Moq.; see *Suaeda maritima* (L.) Dum.
Chenopodina maritima var. vulgaris; see *Suaeda maritima* (L.) Dum.
Chenopodium australe R.Br.; see *Suaeda maritima* (L.) Dum.
Chenopodium maritimum L.; see *Suaeda maritima* (L.) Dum.
Chiratia leucantha Montr.; see *Sonneratia alba* J.E. Smith
Chlorocyperus malaccensis Palla; see *Cyperus malaccensis* Lamk.
Chrysodium aureum Mett.; see *Acrostichum aureum* Linné
Chrysodium aureum var. schmidtii Christ; see *Acrostichum speciosum* Willd.
Chrysodium inaequale Fée.; see *Acrostichum aureum* Linné
Chrysodium speciosum Fée; see *Acrostichum speciosum* Willd.
Chrysodium vulgare Fée.; see *Acrostichum aureum* Linné
Clerodendrum buxifolium (Willd.) Spreng.; see *Clerodendrum inerme* (L.) Gaertn.
Clerodendrum capsulare Blanco; see *Clerodendrum inerme* (L.) Gaertn.
Clerodendrum commersonii Spr. ; see *Clerodendrum inerme* (L.) Gaertn.
***Clerodendrum inerme* (L.) Gaertn. – 266**
Clerodendrum nereifolium (Roxb.) Schauer.; see *Clerodendrum inerme* (L.) Gaertn.
Climacandra obovata Miq.; see *Ardisia elliptica* Thunberg
Climacandra salicifolia MIq.; see *Ardisia elliptica* Thunberg
Clitoria rotundifolia (Vahl.) Sessé & MOc.; see *Canavalia maritima* Thouars
Cocculus populifolius Dc.; see *Anamirta cocculus* L. Wight & Arn.
Cocos nypa Lour.; see *Nypa fruticans* Wurmb.
Collyris minor Vahl.; see *Dischidia nummularia* R.Br.
Colocasia acris (R.Br.) Schott.; see *Colocasia esculenta* (L.) Schott
Colocasia antiquorum Schott. & Endl.; see *Colocasia esculenta* (L.) Schott
***Colocasia esculenta* (L.) Schott – 58**
Colocasia euchlora K. Koch & Linden; see *Colocasia esculenta* (L.) Schott
Colocasia fontanesii Schott.; see *Colocasia esculenta* (L.) Schott
Colocasia himalensis Royle; see *Colocasia esculenta* (L.) Schott
Colocasia nymphaeifolia (Vent.) Kunth; see *Colocasia esculenta* (L.) Schott
Colocasia peregrina Raf.; see *Colocasia esculenta* (L.) Schott
Colocasia vulgaris Raf.; see *Colocasia esculenta* (L.) Schott
Combretopsis pentaptera K. Sch.; see *Lophopyxis maingayi* Hook.f.
Combretum acuminatum (*non* Roxb.) K. Schum. & Hollr.; see *Combretum tetralophum* Clarke
Combretum neurophyllum (*non* Miq.) Backer; see *Combretum tetralophum* Clarke
Combretum lucidum Blume; see *Combretum trifoliatum* Vent.
Combretum tetragonocarpum (*non* Kurz.) Koord.; see *Combretum tetralophum* Clarke
***Combretum tetralophum* Clarke – 111**
***Combretum trifoliatum* Vent. – 112**
Commia cochinchinensis Lour.; see *Excoecaria agallocha* L.
Comocladia serrata Blanco; see *Salacia chinensis* L.
Convolvulus bilobatus Roxb.; see *Ipomoea pes-capre* (L.) Sweet.
Convolvulus brasiliensis Linné; see *Ipomoea pes-capre* (L.) Sweet.
Convolvulus catharticus Blanco; see *Ipomoea tuba* Schlechtend.
Convolvulus denticulatus Desr.; see *Ipomoea gracilis* R. Br.
Convolvulus grandiflorus Jacq.; see *Ipomoea tuba* Schlechtend.
Convolvulus marinus Rumph.; see *Ipomoea pes-capre* (L.) Sweet.
Convolvulus maritima; see *Ipomoea pes-capre* (L.) Sweet.

Convolvulus maritimus Desr.; see *Ipomoea pes-capre* (L.) Sweet.
Convolvulus maximus L.; see *Ipomoea maxima* (L.*f.*) Don *ex* Sweet
Convolvulus pes-caprae Linné; see *Ipomoea pes-capre* (L.) Sweet.
Convolvulus tuba L.; see *Ipomoea tuba* Schlechtend.
Cordia banalo Blanco; see *Cordia subcordata* Lam.
Cordia blancoi Vid.; see *Cordia dichotoma* G. Forst.
***Cordia cochinchinensis* Gagnep. – 159**
***Cordia dichotoma* G. Forst. – 160**
Cordia griffithii C.B. Clarke ; see *Cordia dichotoma* G. Forst.
Cordia moluccana Roxb.; see *Cordia subcordata* Lam.
Cordia myxa auct. non. L. ; see *Cordia dichotoma* G. Forst.
Cordia obliqua auct. non. Willd. ; see *Cordia dichotoma* G. Forst.
Cordia premnifolia Ridl.; see *Cordia cochinchinensis* Gagnep.
Cordia rumphii Blume; see *Cordia subcordata* Lam.
Cordia suaveolens Bl. ; see *Cordia dichotoma* G. Forst.
Cordia suaveolens Vidal ; see *Cordia dichotoma* G. Forst.
***Cordia subcordata* Lam. – 161**
Cordia subdentata Miq. ; see *Cordia dichotoma* G. Forst.
***Corypha saribus* Lour. – 133**
Crinum amabile Donn.; see *Crinum asiaticum* L.
***Crinum asiaticum* L. – 57**
Crinum cortifolium Hallier; see *Crinum asiaticum* L.
Crinum defixum auct. non. Ker-Gawl.; see *Crinum asiaticum* L.
Crinum firmifolium var. *hygrophilum:* see *Crinum asiaticum* L.
Crinum giganteum auct. non. Andr. Blanco; see *Crinum asiaticum* L.
Crinum macrantherum Engler; see *Crinum asiaticum* L.
Crinum macrophyllum Hallier; see *Crinum asiaticum* L.
Crinum northianum Baker; see *Crinum asiaticum* L.
Crinum pedunculatum R.Br.; see *Crinum asiaticum* L.
Crinum rumphii Merr.; see *Crinum asiaticum* L.
Crinum sumatranum Roxb.; see *Crinum asiaticum* L.
Crinum toxicarium; see *Crinum asiaticum* L.
Crithmus indicus Rumph.; see *Sesuvium portulacastrum* (L.) L.
Croton ardisioides Hook. f. ; see *Croton heterocarpus* Müll. Arg.
***Croton heterocarpus* Müll. Arg. – 174**
Croton heteropetalum (Sphalm.) Ridl.; see *Croton heterocarpus* Müll. Arg.
***Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott – 59**
Cryptocoryne ciliata var. *latifolia* (Roxb.) Rataj; see *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott
***Ctenopteris moultoni* (Copel.) C. Christ. & Tardieu – 7**
Ctenopteris moultoni (Copel.) Hollt.; see *Ctenopteris moultoni* (Copel.) C. Christ. & Tardieu
Cumingia philippinensis Vidal; see *Camptostemon philippinense* (Vidal) Becc.
Cupania erythrorhachis Miq.; see *Mischocarpus sundaicus* Blume
Cupania lessertiana Cambess.; see *Mischocarpus sundaicus* Blume
Cupania mischocarpus Steud.; see *Mischocarpus sundaicus* Blume
Cupania revoluta Turcz. ; see *Mischocarpus sundaicus* Blume
Cupania spinosa Blanco.; see *Maytenus emarginata* (Willd.) Ding Hou
Cycas celebica Miq.; see *Cycas rumphii* Miq.
Cycas circinalis L.; see *Cycas rumphii* Miq.
Cycas corsoniana D. Don.; see *Cycas rumphii* Miq.
Cycas recurvata Blume *ex* J. Schuster; see *Cycas rumphii* Miq.
***Cycas rumphii* Miq. – 138**

Cycas sundaica Miq. *ex* J. Schuster; see *Cycas rumphii* Miq.
Cyclandophora elata (King.) Kosterm.; see *Atuna racemosa ssp. racemosa* Rafin.
Cyclandrophora glaberrimima Hassk.; see *Atuna racemosa ssp. racemosa* Rafin.
Cyclandrophora scabra (Hassk.) Kosterm.; see *Atuna racemosa ssp. racemosa* Rafin.
Cyclophorus acrostichoides (G. Forst.) Presl.; see *Pyrrosia longifolia* (Burm.) Morton.
Cyclophorus cinnamomeus; see *Pyrrosia longifolia* (Burm.) Morton.
Cyclophorus longifolius Desv.; see *Pyrrosia longifolia* (Burm.) Morton.
Cymbidium aloifolium (L.) Sw.; see *Cymbidium finlaysonianum* Wall *ex* Lindl.
***Cymbidium finlaysonianum* Wall *ex* Lindl. – 92**
Cymbidium iridifolium Roxb.; see *Oberonia iridifolia* Lindl.
Cymbidium iridifolium Sw. ex Steud.; see *Oberonia iridifolia* Lindl.
Cymbidium moschatum Willd.; see *Dendrobium moschatum* (Buch.-Ham.) Sw.
Cymbidium pendulum (Roxb.) Sw. *sensu latu*; see *Cymbidium finlaysonianum* Wall *ex* Lindl.
Cymbidium pendulum var. brevilabre Lindl.; see *Cymbidium finlaysonianum* Wall *ex* Lindl.
Cymbidium tricolor Miq.; see *Cymbidium finlaysonianum* Wall *ex* Lindl.
Cyminosma pedunculata DC.; see *Acronychia pedunculata* (L.) Miq.
Cynanchum carnosum Domin.; see *Oxystelma carnosum* R. Br.
Cynanchum carnosum Merr. & Rolfe.; see *Oxystelma carnosum* R. Br.
Cynanchum carnosum (R.Br.) Schltr.; see *Oxystelma carnosum* R. Br.
Cynodon arcuatus J.S. Presl. *ex* C.B. Presl.; see *Cynodon dactylon* (L.) Pers.
***Cynodon dactylon* (L.) Pers. – 42**
Cynodon dactylon var. glabratus (Steud.) Chiov.; see *Cynodon dactylon* (L.) Pers.
Cynodon glabratus Steud.; see *Cynodon dactylon* (L.) Pers.
Cynodon parviglumus Ohwi; see *Cynodon dactylon* (L.) Pers.
Cynodon polevansii Stent.; see *Cynodon dactylon* (L.) Pers.
Cynometra bijuga Span. *ex* Miq.; see *Cynometra ramiflora* L.
Cynometra bijuga var. *mimosoides* Merr.; see *Cynometra iripa* Kostel.
***Cynometra iripa* Kostel. – 192**
Cynometra polyandra auct. non Roxb.; see *Cynometra ramiflora* L.
***Cynometra ramiflora* L. – 193**
Cynometra ramiflora var. Wight & Arn.; see *Cynometra iripa* Kostel.
Cynometra ramiflora var. *mimosoides* Baker; see *Cynometra iripa* Kostel.
Cynometra schumanniana Harms.; see *Cynometra ramiflora* L.
Cynometra whitfordii Elmer; see *Cynometra ramiflora* L.
Cynomorium silvestre; see *Cynometra ramiflora* L.
Cyperus anomalus Steud.; see *Cyperus javanicus* Houtt.
Cyperus bulboso-stoloniferus Steud.; see *Cyperus stoloniferus* Retz.
Cyperus bulbosus (non Vahl.) Camus.; see *Cyperus stoloniferus* Retz.
Cyperus canescens Vahl.; see *Cyperus javanicus* Houtt.
***Cyperus compactus* Retz. – 25**
Cyperus corymbosus Rottb. *var. scariosus* Kük.; see *Cyperus scariosus* R.Br.
Cyperus difformis (*non* L.) Blanco; see *Scirpus grossus* Linné
Cyperus dilutus Vahl.; see *Cyperus compactus* Retz.
Cyperus diphyllus (Retz) Valck.; see *Cyperus scariosus* R.Br.
Cyperus dulcis Rumph.; see *Eleocharis dulcis* (Burm. f.) Henschel
Cyperus firmus Presl.; see *Cyperus javanicus* Houtt.
Cyperus grabowskianus Bolck.; see *Cyperus compactus* Retz.
Cyperus holciflorus Presl.; see *Cyperus javanicus* Houtt.
***Cyperus javanicus* Houtt. – 26**
Cyperus lamprocarpus Nees; see *Cyperus stoloniferus* Retz.

Cyperus litoralis R.Br.; see *Cyperus stoloniferus* Retz.
Cyperus luzonensis Llanos; see *Cyperus compactus* Retz.
***Cyperus malaccensis* Lamk. – 27**
Cyperus mayeri Kük; see *Cyperus stoloniferus* Retz.
Cyperus parviflorus Vahl.; see *Cyperus javanicus* Houtt.
Cyperus pennatus Lamk.; see *Cyperus javanicus* Houtt.
Cyperus rotundus (non L.) Benth.; see *Cyperus stoloniferus* Retz.
Cyperus rotundus L. var. *pallidus* Benth.; see *Cyperus scariosus* R.Br.
***Cyperus scariosus* R.Br. – 28**
Cyperus septatus Steud.; see *Cyperus compactus* Retz.
Cyperus spaniophyllus Steud.; see *Cyperus malaccensis* Lamk.
Cyperus stigmatosus Steud.; see *Cyperus javanicus* Houtt.
***Cyperus stoloniferus* Retz. – 29**
Cyperus stuppeus Forst.; see *Cyperus javanicus* Houtt.
Cyperus tegetiformis (non Roxb.) Benth.; see *Cyperus malaccensis* Lamk.
Cyperus tegetum (*non* Roxb.) Ridl.; see *Cyperus malaccensis* Lamk.
Cyperus tuberosus (non Rottb.) Kunth.; see *Cyperus stoloniferus* Retz.
Cytisus pinnatus Linn.; see *Pongamia pinnata* (L.) Pierre
Daemonorops erinaceus; see *Calamus erinaceus* (Becc.) Dransfield
Daemonorops leptopus; see *Calamus erinaceus* (Becc.) Dransfield
Dalbergia arborea Willd.; see *Pongamia pinnata* (L.) Pierre
***Dalbergia candenatensis* (Dennst.) Prain – 119**
Dalbergia heterophylla, Robinia uliginosa Willd.; see *Derris trifoliata* Lour.
***Dalbergia menoeides* Prain. – 120**
Dalbergia monosperma Dalzell; see *Dalbergia candenatensis* (Dennst.) Prain
Dalbergia pinnata (Lour.) Prain.; see *Derris pinnata* (Lour.) Prain
Dalbergia tamarindifolia Roxb.; see *Derris pinnata* (Lour.) Prain
Dalbergia torta Graham; see *Dalbergia candenatensis* (Dennst.) Prain
Davallia angustata Wall.; see *Pachypleuria angustata* (Wall. ex Hook. & Grev.) J. Sm.
Davallia divaricata Blume
Davalia mucronata Bl; see Davallia divaricata Blume
Davallia parvula Wall.; see *Davallia parvula* Wall. ex Hook. & Grev.
***Davallia parvula* Wall. ex Hook. & Grev. – 4**
Davalia polyantha Hook*; see Davallia divaricata* Blume
Deguelia negrensis (Benth.) Taub.; see *Derris scandens* (Aubl.) Pittier
Deguelia scandens Aubl.; see *Derris scandens* (Aubl.) Pittier
Deguelia uliginosa (Willd.) Baill.; see *Derris trifoliata* Lour.
***Dendrobium aloefolium* (Bl.) Rchb.f. – 93**
Dendrobium aloifolium; see *Dendrobium aloefolium* (Bl.) Rchb.f.
Dendrobium baseyanum St. Cloud; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrobium borneense Finet.; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Dendrobium calamiforme Lodd. ex Lindley; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrobium carnosum Teijsm. et Binn.; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
***Dendrobium moschatum* (Buch.-Ham.) Sw. – 94**
***Dendrobium pachyphyllum* (O.K.) Bakh. f. – 95**
Dendrobium perpusillum Balakaristan; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Dendrobium pisibulbum Guillaummin; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Dendrobium pumila Roxb.; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Dendrobium pussilum (Bl.) Lindl.; see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Dendrobium serra; see *Dendrobium aloefolium* (Bl.) Rchb.f.

***Dendrobium subulatum* (Bl.) Lindl. – 96**
Dendrobium teretifolium R. Br.; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrobium teretifolium forma aureum (F.M. Bailey) Clemesha; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrobium teretifolium var. aureum F.M. Bailey; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrobium teretifolium var. fasciculata Rupp.; see *Dockrillia teretifolia* (R.Br.) Brieger
Dendrophthoe farinosus Mart.; see *Dendrophthoe pentandra* (L.) Miq.
Dendrophthoe leucobotrya Miq.; see *Dendrophthoe pentandra* (L.) Miq.
***Dendrophthoe pentandra* (L.) Miq. – 86**
Dendrophthoe venosus Mart.; see *Dendrophthoe pentandra* (L.) Miq.
Derris guianensis Benth.; see *Derris scandens* (Aubl.) Pittier
Derris heptaphylla (L) Merr.; see *Aganope heptaphylla* (L.) Polhill
Derris heterophylla (Willd.) Backer; see *Derris trifoliata* Lour.
Derris indica (Lam.) Bennet.; see *Pongamia pinnata* (L.) Pierre
Derris macroloba; see *Aganope heptaphylla* (L.) Polhill
Derris negrensis Benth.; see *Derris scandens* (Aubl.) Pittier
***Derris pinnata* (Lour.) Prain – 194**
Derris pinnata Lour.; see *Derris pinnata* (Lour.) Prain
Derris pterocarpus (DC.) Killip.; see *Derris scandens* (Aubl.) Pittier
***Derris scandens* (Aubl.) Pittier – 121**
Derris scandens Benth. J. Linn.; see *Derris scandens* (Aubl.) Pittier
Derris scandens (Roxb.) Benth.; see *Derris scandens* (Aubl.) Pittier
Derris sinuata Thwaites; see *Aganope heptaphylla* (L.) Polhill
***Derris trifoliata* Lour. – 122**
Deguelia trifoliata (Lour.) Taub.; see *Derris trifoliata* Lour.
Derris uliginosa Willd. Benth.; see *Derris trifoliata* Lour.
Dialycarpa beccarii Mast.; see *Brownlowia tersa* (L.) Kosterm.
Dicerolepis paludosa Blume; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green
Didymoglossum affine v.d.B.; see *Hymenophyllum holochilum* (Bosch) C. Chr.
Didymoglossum holochilum Bosch; see *Hymenophyllum holochilum* (Bosch) C. Chr.
Dinebra verticillata Wight ex Steud.; see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Diospyros abyssinica (Hiern.) F.White; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros embryopteris Pers.; see *Diospyros malabarica* (Descr.) Kostel.
Diospyros embryopteris var. *siamensis* (Hochr.) Phengklai; see *Diospyros malabarica* (Descr.) Kostel.
***Diospyros ferrea* (Willd.) Bakh. – 170**
Diospyros ferrea var. *buxifolia* (Rottb.) Bakh.; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros ferrea var. *guineensis* (Schumach. & Tonn.) Bakh.; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros ferrea var. *littorea*; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros ferrea var. *madagascarensis* (A.DC.) Bakh.; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros ferrea var. *reticulata*; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros glutinosa Koenig. & Roxb.; see *Diospyros malabarica* (Descr.) Kostel.
Diospyros kusanoi Hayata; see *Diospyros maritima* Blume
Diospyros littorea (R.Br.) Kostermans; see *Diospyros ferrea* (Willd.) Bakh.
Diospyros liukiuensis Makino; see *Diospyros maritima* Blume
***Diospyros malabarica* (Descr.) Kostel. – 171**
Diospyros malabarica var. *malabarica*; see *Diospyros malabarica* (Descr.) Kostel.
***Diospyros maritima* Blume – 172**
Diospyros maritima var. *transita* (Bakh.) Kosterm; see *Diospyros maritima* Blume
Diospyros melanoxylon Hassk.; see *Diospyros malabarica* (Descr.) Kostel.
Diospyros peregrina f. *javanica* (Gaert.) Guerke.; see *Diospyros malabarica* (Descr.) Kostel.
Diospyros peregrina Guerke.; see *Diospyros malabarica* (Descr.) Kostel.

Diospyros siamensis Hochr.; see *Diospyros malabarica* (Descr.) Kostel.
Diospyros siamensis Ridl.; see *Diospyros malabarica* (Descr.) Kostel.
Diphyes ovalifolia Blume; see *Bulbophyllum xylocarpi* J.J.Smith
***Diplachne fusca* (L.) Beauv. – 43**
Diplachne polystachya; see *Diplachne fusca* (L.) Beauv.
***Dischidia benghalensis* Colebr. – 78**
Dischidia benghalensis var. cuneifolia (Wall.) Kuntze; see *Dischidia benghalensis* Colebr.
Dischidia benghalensis var. spathulata (Blume) Kuntze; see *Dischidia benghalensis* Colebr.
Dischidia cuneifolia Wall.; see *Dischidia benghalensis* Colebr.
Dischidia gaudichaudii Decne.; see *Dischidia nummularia* R.Br.
Dischidia minor (Vahl.) Merr.; see *Dischidia nummularia* R.Br.
***Dischidia nummularia* R.Br. – 79**
Dischidia orbicularis Decne.; see *Dischidia nummularia* R.Br.
***Dischidia rafflesiana* Wall. – 80**
Dischidia spathulata (Bl.); see *Dischidia benghalensis* Colebr.
Dockrillia calamiforme (Lodd. ex Lindl.) M.A. Clem. & D.L. Jones; see *Dockrillia teretifolia* (R.Br.) Brieger
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Dolichandrone longissima K. Sch.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Dolichandrone rheedii Seem; see *Dolichandrone spathacea* (l.f.) K.Schum.
***Dolichandrone spathacea* (l.f.) K.Schum. – 156**
Dolichos emarginata Jacq.; see *Canavalia maritima* Thouars
Dolichos gigantea Willd.; see *Mucuna gigantea* (Willd.) DC.
Dolichos giganteus Willd.; see *Mucuna gigantea* (Willd.) DC.
Dolichos littoralis Vahl.; see *Canavalia maritima* Thouars
Dolichos maritimus Aubl.; see *Canavalia maritima* Thouars
Dolichos miniatus Kunth.; see *Canavalia maritima* Thouars
Dolichos obcordatus Roxb.; see *Canavalia maritima* Thouars
Dolichos obovatus Schumach. & Thonn.; see *Canavalia maritima* Thouars
Dolichis obtusifolius Lam.; see *Canavalia maritima* Thouars
Dolichos rosea Sw.; see *Canavalia maritima* Thouars
Dolichos rotundifolia Vahl.; see *Canavalia maritima* Thouars
Dondia maritima (L.) Druce; see *Suaeda maritima* (L.) Dum.
Dracontium spinosum L.; see *Lasia spinosa* (L.) Thwaites.
Drymoglossum heterophyllum C. Chr.; see *Drymoglossum piloselloides* (Linn.) Presl.
***Drymoglossum piloselloides* (Linn.) Presl. – 12**
Drynaria linnaei Bory.; see *Drynaria sparsisora* (Desv.) Moore
***Drynaria rigidula* (Sw.) Bedd. – 13**
***Drynaria sparsisora* (Desv.) Moore – 14**
Dryostachyum speciosum Kuhn; see *Photinopteris speciosa* (Bl.) Persl.
Duraljouvea diluta Palla; see *Cyperus compactus* Retz.
Duvaljouvea pennata Palla.; see *Cyperus javanicus* Houtt.
Dysosmia foetida (L.) M. Roem; see *Passiflora foetida* L.
Ebenus buxifolius (Rottb.) Kuntze; see *Diospyros ferrea* (Willd.) Bakh.
Ebenus parvifolius Rumphius; see *Diospyros ferrea* (Willd.) Bakh.
Ehretia ferrea Willd.; see *Diospyros ferrea* (Willd.) Bakh.
Elaeodendron horizontale Turcz.; see *Maytenus emarginata* (Willd.) Ding Hou
Elaeodendron subrotundum King.; see *Cassine viburnifolia* (Juss.) Ding Hou
Elaeodendron viburnifolium Merr.; see *Cassine viburnifolia* (Juss.) Ding Hou
***Elaphoglossum amblyphyllum* C.R. Bell. – 9**

Elaphoglossum decurrens Moore; see *Elaphoglossum amblyphyllum* C.R. Bell.
Elaphoglossum obtusifolium Bell.; see *Elaphoglossum amblyphyllum* C.R. Bell.
Elateriospermum paucinervia; see *Blumeodendron tokbrai* (Bl.) Kurz.
Elateriospermum tokbrai Bl.; see *Blumeodendron tokbrai* (Bl.) Kurz.
Elcana seminuda Blanco; see *Cerbera manghas* L.
***Eleocharis dulcis* (Burm. f.) Henschel – 30**
Eleocharis dulcis Trin.; see *Eleocharis dulcis* (Burm. f.) Henschel
Eleocharis equisetina Presl.; see *Eleocharis dulcis* (Burm. f.) Henschel
Eleocharis indica Druce; see *Eleocharis dulcis* (Burm. f.) Henschel
***Eleocharis parvula* (R. & S.) Link ex Bluff – 31**
Eleocharis plantaginea; see *Eleocharis dulcis* (Burm. f.) Henschel
Eleocharis plantaginoidea Domin.; see *Eleocharis dulcis* (Burm. f.) Henschel
***Eleocharis spiralis* (Rottb.) R. & S. – 32**
Eleocharis tuberosa R & S Mant.; see *Eleocharis dulcis* (Burm. f.) Henschel
Eleocharis variegata (*non* Presl., *nec* Kunth.) Merr.; see *Eleocharis spiralis* (Rottb.) R. & S.
Elytranthe ampullacea G. Don.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Elytranthe cochinchinensis G. Don.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Elytranthe elmeri Merr.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Elytranthe farinosa & rigida G. Don.; see *Dendrophthoe pentandra* (L.) Miq.
Embryogonia lucida Blume; see *Combretum trifoliatum* Vent.
Entada monostachya DC.; see *Entada phaseoloides* (L.) Merr.
***Entada phaseoloides* (L.) Merr. – 123**
Entada pursaetha DC.; see *Entada phaseoloides* (L.) Merr.
Entada rumphii Scheff.; see *Entada phaseoloides* (L.) Merr.
Entada scandens (L.) Benth.; see *Entada phaseoloides* (L.) Merr.
Eperua decandra Blanco; see *Intsia bijuga* (Colebr.) Kuntze
Epidendrum moschatum Buch.-Ham.; see *Dendrobium moschatum* (Buch.-Ham.) Sw.
Epidendrum odoratum Poir.; see *Aerides odoratum* Reinw. *ex* Blume
Eragrostis wightiana Benth.; see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Erigeron denticulatum Burm. *f.*; see *Pluchea indica* (L.) Less.
Erythrina corallodendrum L. var. *orientalis*; see *Erythrina orientalis* (L.) Murr.
Erythrina indica Lamk.; see *Erythrina orientalis* (L.) Murr.
Erythrina indica var. *alba* W.S. Millard & E. Blatter; see *Erythrina orientalis* (L.) Murr.
Erythrina indica var. *fastigiata* Guillaumin; see *Erythrina orientalis* (L.) Murr.
Erythrina indica var. *marmorata* (Planchon) B.& M.; see *Erythrina orientalis* (L.) Murr.
Erythrina indica var. *picta* (L.) B.&.M.; see *Erythrina orientalis* (L.) Murr.
Erythrina indica Zoll.; see *Erythrina orientalis* (L.) Murr.
***Erythrina orientalis* (L.) Murr. – 195**
Erythrina variegata L.; see *Erythrina orientalis* (L.) Murr.
Erythrina variegata var. *orientalis* (L.) Merr.; see *Erythrina orientalis* (L.) Murr.
Eugenia racemosa L.; see *Barringtonia racemosa* (L.) Spreng.
Eugeniodes celastrifolius O.K.; see *Symplocos celastrifolia* Griff. ex Clarke
Euonymus cochinchinensis Merr.; see *Cassine viburnifolia* (Juss.) Ding Hou
Euonymus viburnifolius Merr.; see *Cassine viburnifolia* (Juss.) Ding Hou
Eurycoma harmandiana Pierre; see *Quassia harmandiana* (Pierre) Nooteboom
***Excoecaria agallocha* L. – 175**
***Excoecaria indica* (Willd.) Muell. Arg. – 176**
Faba marina major Rumph.; see *Entada phaseoloides* (L.) Merr.
***Fagraea crenulata* Maingay ex C.B. Clarke – 180**
Fagraea fastigiata (*non* Bl.) Ridl.; see *Fagraea crenulata* Maingay ex C.B. Clarke

Ferolia glaberrima (Hassk.) O. Ktze.; see *Atuna racemosa ssp. racemosa* Rafin.
Ferolia scabra (Hassk.) O. Ktze.; see *Atuna racemosa ssp. racemosa* Rafin.
Ferreola guineensis Schumach. & Tonn.; see *Diospyros ferrea* (Willd.) Bakh.
Festuca fusca L..; see *Diplachne fusca* (L.) Beauv.
Feuilleea serianthes Kuntze; see *Serianthes grandiflora* Bentham.
Feuilleea umbellata (Vahl.) Kuntze; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
***Ficus curtipes* Corner – 212**
***Ficus microcarpa* L.f. – 213**
Ficus obtusifolia Roxb.; see *Ficus curtipes* Corner
Ficus retusiformis H. Lév; see *Ficus microcarpa* L.f.
Fimbriatylus laevissima Steud.; see *Fimbristylis cymosa* R. Br.
Fimbristylis albescens Steud.; see *Fimbristylis polytrichoides* (Retz.) R. Br.
Fimbristylis arvensis Vahl.; see *Fimbristylis sieberiana* R. Br.
Fimbristylis atollensis St. John; see *Fimbristylis cymosa* R. Br.
Fimbristylis ciliolata Steud.; see *Fimbristylis cymosa* R. Br.
***Fimbristylis cymosa* R. Br. – 33**
Fimbristylis cyrtophylla Miq.; see *Fimbristylis ferruginea* (L.) Vahl
Fimbristylis dasyphylla Miq.; see *Fimbristylis sericea* R. Br.
Fimbristylis decora Nees & Mey. *ex* Nees; see *Fimbristylis sericea* R. Br.
***Fimbristylis ferruginea* (L.) Vahl – 34**
Fimbristylis ferruginea (*non* Vahl.) Decne; see *Fimbristylis sieberiana* R. Br.
Fimbristylis ferruginea var. foliata Benth.; see *Fimbristylis sieberiana* R. Br.
Fimbristylis ferruginea var. sieberiana Boeck.; see *Fimbristylis sieberiana* R. Br.
Fimbristylis glomerata Nees *ex* Kunth.; see *Fimbristylis cymosa* R. Br.
Fimbristylis juncea (non R. & S.) Boeck; see *Fimbristylis polytrichoides* (Retz.) R. Br.
Fimbristylis junciformis var. latifolia (*non* Clarke) Camus; see *Fimbristylis sericea* R. Br.*Fimbristylis longispicata* (non Steud.) Camus; see *Fimbristylis ferruginea* (L.) Vahl
Fimbristylis marginata Labill.; see *Fimbristylis ferruginea* (L.) Vahl
Fimbristylis paucispicata F.v.M.; see *Fimbristylis sieberiana* R. Br.
Fimbristylis polytrichoides (non R.BR.) Ridl.; see *Fimbristylis ferruginea* (L.) Vahl
***Fimbristylis polytrichoides* (Retz.) R. Br. – 35**
Fimbristylis pycnocephala Hillebr.; see *Fimbristylis cymosa* R. Br.
Fimbristylis rigida Kunth.; see *Fimbristylis cymosa* R. Br.
***Fimbristylis sericea* R. Br. – 36**
***Fimbristylis sieberiana* R. Br. – 37**
Fimbristylis spathacea Roth.; see *Fimbristylis cymosa* R. Br.
Fimbristylis subbulbosa Boeck.; see *Fimbristylis polytrichoides* (Retz.) R. Br.
Fimbristylis trispicata Steud.; see *Fimbristylis ferruginea* (L.) Vahl
Fimbristylis tristachya R.Br.; see *Fimbristylis sieberiana* R. Br.
Fimbristylis warburgii K. Sch.; see *Fimbristylis cymosa* R. Br.
Finlaysonia maritima Backer; see *Finlaysonia obovata* Wall.
***Finlaysonia obovata* Wall. – 103**
***Flagellaria indica* L. – 113**
Flagellaria indica var. *gracilis* Backer; see *Flagellaria indica* L.
Flagellaria indica var. *minor* (Bl.) Koord.; see *Flagellaria indica* L.
Palmijuncus laevis Rumph.; see *Flagellaria indica* L.
Flagellaria minor Bl.; see *Flagellaria indica* L.
Flagellaria philippinensis Elmer; see *Flagellaria indica* L.
Fragarius niger Rumph.; see *Melastoma malabathricum* var. *malabathricum* L.
Funis convolutus Rumph.; see *Aganope heptaphylla* (L.) Polhill

Galedupa indica Lam.; see *Pongamia pinnata* (L.) Pierre
Galedupa maculata Blanco; see *Pongamia pinnata* (L.) Pierre
Galedupa pinnata Taub.; see *Pongamia pinnata* (L.) Pierre
Garcinia malabarica Desr.; see *Diospyros malabarica* (Descr.) Kostel.
Gardenia elata Ridl.; see *Gardenia tubifera* Wall.
Gardenia gumnifera; see *Gardenia tubifera* Wall.
Gardenia lucida Roxb.; see *Gardenia tubifera* Wall.
Gardenia resinifera Korth.; see *Gardenia tubifera* Wall.
Gardenia speciosa (Hk.) Hk. f.; see *Gardenia tubifera* Wall.
***Gardenia tubifera* Wall. – 240**
Gela lanceolata Lour.; see *Acronychia pedunculata* (L.) Miq.
Gelala litorea Rumphius (=type)
Getonia floribunda Roxb.; see *Calycopteris floribunda* (Roxb.) Lamk
Glabraria tersa Linné; see *Brownlowia tersa* (L.) Kosterm.
***Glochidion littorale* Bl. – 177**
Glochidion littoralis; see *Glochidion littorale* Bl.
Gluta coarctata Hook.; see *Gluta velutina* Bl.
***Gluta velutina* Bl. – 140**
Gmella trifolia Lour.; see *Allophylus cobbe* (L.) Raeusch.
Goniophlebium rigidulum Moore; see *Drynaria rigidula* (Sw.) Bedd.
Grammitis heterocarpa Bl.; see *Selliguea heterocarpa* Blume
Grammitis involuta Don.; see *Loxogramma involuta* Presl.
Granadilla foetida (L.) Gaertn.; see *Passiflora foetida* L.
Granatum litoreum parvifolium Rumph.; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Granatum littoreum parvifolium Rumph.; see *Xylocarpus granatum* Koen.
Granatum moluccensis (Lam.) Kuntze; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Granatum obovatum (Blume) Kunzte; see *Xylocarpus granatum* Koen.
Grewia meyeniana Walp.; see *Kleinhovia hospita* L..
Guarea oblongifolia Griff.; see *Xylocarpus granatum* Koen.
***Guettarda speciosa* Linn. – 241**
Guettarda vermicularis Blanco; see *Guettarda speciosa* Linn.
Guilandina bonduc L.; see *Caesalpinia bonduc* (L.) Roxb.
Guilandina bonducella L.; see *Caesalpinia crista* L.
Guilandina nuga L.; see *Caesalpinia crista* L.
Gymnanthera nitida R. Br.; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green
***Gymnanthera oblonga* (Burm. *f*) P.S. Green – 104**
Gymnanthera paludosa (Bl.) K.Schum.; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green
Gymnogramma heterocarpa Bl.; see *Selliguea heterocarpa* Blume
Gymnogramma involuta Hook.; see *Loxogramma involuta* Presl.
Gymnosporia ambigua Vidal.; see *Maytenus emarginata* (Willd.) Ding Hou
Gymnosporia emarginata Thw.; see *Maytenus emarginata* (Willd.) Ding Hou
Gymnosporia inermis Merr. & Perry.; see *Maytenus emarginata* (Willd.) Ding Hou
Gymnosporia montana Benth.; see *Maytenus emarginata* (Willd.) Ding Hou
Gymnosporia spinosa (Blanco) Merr. & Rolfe.; see *Maytenus emarginata* (Willd.) Ding Hou
Gyrosorium cinnamomeus; see *Pyrrosia longifolia* (Burm.) Morton.
Gyrosorus fissum Bak.; see *Pyrrosia longifolia* (Burm.) Morton.
Haemanthus pubescens auct. non. L. f : Blanco; see *Crinum asiaticum* L.
***Halocnemum cinereum* F.v.Muell. – 61**
*Halosarcia indica (*Willd.) Moq.; see *Salicornia indica* Willd.
Helicteres apetala Blanco; *Heritiera littoralis* Dryand.

Heptapleurum avene sensu King; see *Schefflera lanceolata* Ridl.
Heritiera attenuata; see *Brownlowia tersa* (L.) Kosterm.
***Heritiera fomes* Buch. Ham. – 259**
***Heritiera globosa* Kostermans – 260**
Heritiera lanceolata; see *Brownlowia tersa* (L.) Kosterm.
***Heritiera littoralis* Dryand. – 261**
Heritiera littoralis Dryand. ex W.Ait.; see *Heritiera littoralis* Dryand.
Heritiera minor Lam.; see *Heritiera littoralis* Dryand.
Hernandezia sonora (L.) Hoffman; see *Hernandia ovigera* L.
Hernandia guianensis Aubl.; see *Hernandia ovigera* L.
Hernandia javanica Tuyama; see *Hernandia ovigera* L.
Hernandia nymphaeifolia (Presl.); see *Hernandia ovigera* L.
***Hernandia ovigera* L. – 184**
Hernandia papuana C.T. White; see *Hernandia ovigera* L.
Hernandia peltata Meisn.; see *Hernandia ovigera* L.
Hernandia peltata Sessé/ & Moc.; see *Hernandia ovigera* L.
Hernandia sonora L.; see *Hernandia ovigera* L.
Heymassoli inermis Aubl. ; see *Ximenia americana* L.
Heymassoli spinosa Aubl. ; see *Ximenia americana* L.
Hibiscus abutiloides Willd.; see *Hibiscus tiliaceus* L.
Hibiscus bacciferus Forster; see *Thespesia populnea* (L.) Soland. ex Correa
Hibiscus celebicus Koord.; see *Hibiscus tiliaceus* L.
Hibiscus cuspidatus Sol. *ex* Park.; see *Hibiscus tiliaceus* L.
Hibiscus elatus (*non* Sw.) Miq.; see *Hibiscus tiliaceus* L.
Hibiscus hastatus L.; see *Hibiscus tiliaceus* L.
Hibiscus macrophyllus (Bl.) Oken; see *Thespesia populnea* (L.) Soland. ex Correa
Hibiscus populneus L.; see *Thespesia populnea* (L.) Soland. ex Correa
Hibiscus similis Blume; see *Hibiscus tiliaceus* L.
***Hibiscus tiliaceus* L. – 203**
Hibiscus tricuspis Sol. *ex* Park.; see *Hibiscus tiliaceus* L.
Hieraea reclinata Blanco; see *Tristellateia australasiae* A. Rich.
Hillia longiflora Blanco; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Hippocratea hasseltiana Miq.; see *Loeseneriella macrantha* (Korth.) A.C. Smith
Hippocratea macrantha Korth.; see *Loeseneriella macrantha* (Korth.) A.C. Smith
Hippocratea trilobulata Ridl.; see *Loeseneriella macrantha* (Korth.) A.C. Smith
Hippuris indica Lour.; see *Eleocharis dulcis* (Burm. f.) Henschel
Hiraea obscura Blume; see *Ryssopterys timoriensis* (DC.) Jussieu
Hiraea ovata Blume; see *Ryssopterys timoriensis* (DC.) Jussieu
Homalium gilgianum Laut.; see *Lophopyxis maingayi* Hook.f.
Horsfieldia acuminata Merr.; see *Horsfieldia irya* (Gaertn.) Warb.
Horsfieldia amklaal Kaneh.; see *Horsfieldia irya* (Gaertn.) Warb.
Horsfieldia congestiflora A.C. Sm.; see *Horsfieldia irya* (Gaertn.) Warb.
***Horsfieldia irya* (Gaertn.) Warb. – 215**
Horsfieldia labillardieri Warb.; see *Horsfieldia irya* (Gaertn.) Warb.
Horsfieldia lemanniana (A.DC.) Warb.; see *Horsfieldia irya* (Gaertn.) Warb.
Horsfieldia nunu Kaneh.; see *Horsfieldia irya* (Gaertn.) Warb.
Horsfieldia subglobosa (Miq.) Warb.; see *Horsfieldia irya* (Gaertn.) Warb.
Hoya hookeriana Wight; see *Hoya parasitica* (Roxb.) Wall. *ex* Wight
***Hoya parasitica* (Roxb.) Wall. *ex* Wight – 81**
Humata angustata (Wall.) J.Sm.; see *Pachypleuria angustata* (Wall. ex Hook. & Grev.) J. Sm.

Humata angustata (Wall. ex Hook. & Grev.) J.Sm.; see *Pachypleuria angustata* (Wall. ex Hook. & Grev.) J. Sm.
Humata parvula (Wall.) Mett.; see *Davallia parvula* Wall. ex Hook. & Grev.
Huperzia carinata (Desv. ex Poir.) Trevis.; see *Lycopodium carinatum* Desv.
Hydnophytum amboinense Becc.; see *Hydnophytum formicarum* Jack
***Hydnophytum formicarum* Jack – 101**
Hymenochaeta lacustris (L.) Nakai; see *Scirpus lacustris* L.
***Hymenophyllum holochilum* (Bosch) C. Chr. – 8**
Hymenophyllum smithii Hook; see *Hymenophyllum holochilum* (Bosch) C. Chr.
Hypserpa latifolia; see *Hypserpa polyandra* Becc.
Hypserpa monilifera; see *Hypserpa polyandra* Becc.
***Hypserpa polyandra* Becc. – 129**
Hypserpa raapii; see *Hypserpa polyandra* Becc.
Hypserpa selebica; see *Hypserpa polyandra* Becc.
Ichthyoctonos litorea Rumph.; see *Excoecaria indica* (Willd.) Muell. Arg.
***Ilex cymosa* Blume – 144**
***Ilex maingayi* Hook f. – 145**
Ilex singaporeana Wall.; see *Ilex cymosa* Blume
Inga corcondiana DC.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Inga pterocarpa DC.; see *Peltophorum pterocarpum* (DC.) K. Heyne
Inga umbellata (Vahl.) Willd.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Inocarpus edulis J.R. & G. Forst.; see *Inocarpus fagifer* (Parkinson) Fosb.
***Inocarpus fagifer* (Parkinson) Fosb. – 196**
Inocarpus fagiferus; see *Inocarpus fagifer* (Parkinson) Fosb.
Inodaphnis lanceolata Miq.; see *Inocarpus fagifer* (Parkinson) Fosb.
Intsia amboinensis Thouars.; see *Intsia bijuga* (Colebr.) Kuntze
***Intsia bijuga* (Colebr.) Kuntze – 197**
Intsia madagascariensis Thouars ex DC; see *Intsia bijuga* (Colebr.) Kuntze
Intsia retusa Colebr.; see *Intsia bijuga* (Colebr.) Kuntze
Ipomoea alba L.; see *Ipomoea tuba* Schlechtend.
Ipomoea biloba Forsk.; see *Ipomoea pes-capre* (L.) Sweet.
Ipomoea denticulata Choisy; see *Ipomoea gracilis* R. Br.
***Ipomoea gracilis* R. Br. – 64**
Ipomoea grandiflora Hallier *f.*; see *Ipomoea tuba* Schlechtend.
Ipomoea macrantha Roem. & Schult.; see *Ipomoea tuba* Schlechtend.
Ipomoea maritima R.Br.; see *Ipomoea pes-capre* (L.) Sweet.
***Ipomoea maxima* (L.*f.*) Don *ex* Sweet – 65**
Ipomoea littoralis Bl.; see *Ipomoea gracilis* R. Br.
Ipomoea pes-caprae Roth.; see *Ipomoea pes-capre* (L.) Sweet.
***Ipomoea pes-capre* (L.) Sweet. – 66**
Ipomoea sepiaria Koen. *ex* Roxb.; see *Ipomoea maxima* (L.*f.*) Don *ex* Sweet
Ipomoea subtrilobans Miq.; see *Ipomoea maxima* (L.*f.*) Don *ex* Sweet
***Ipomoea tuba* Schlechtend. – 67**
Ipomoea verrucosa Bl.; see *Ipomoea maxima* (L.*f.*) Don *ex* Sweet
Ipomoea violacea L.; see *Ipomoea tuba* Schlechtend.
Iridorchis iridifolia (Lindl.) Kuntze; see *Oberonia iridifolia* Lindl.
Iriha cymosa O.K.; see *Fimbristylis cymosa* R. Br.
Iriha ferruginea O.K.; see *Fimbristylis ferruginea* (L.) Vahl
Iriha glomerata Nees; see *Fimbristylis cymosa* R. Br.
Iriha polytrichoides O.K.; see *Fimbristylis polytrichoides* (Retz.) R. Br.

Iriha sericea O.K..; see *Fimbristylis sericea* R. Br.
Ischnostemma carnosum (Schltr.) Merr. & Rolfe; see *Oxystelma carnosum* R. Br.
Isolepis haenkei Presl.; see *Fimbristylis cymosa* R. Br.
Isoloma lanuginosa Sm.; see *Nephrolepis acutifolia* (Desv.) H. Christ.
Ixora manila Blanco; see *Scyphiphora hydrophyllacea* Gaertn. f.
***Ixora timorensis* Decne – 242**
Jambolifera pedunculata L.; see *Acronychia pedunculata* (L.) Miq.
Jasminum litoreaum Rumph.; see *Clerodendrum inerme* (L.) Gaertn.
Jasminum oblongum Burm.; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green
Kambala apetala Rafin.; see *Sonneratia apetala* Buch.-Ham.
***Kandelia candel* (L.) Druce – 236**
Kandelia rheedei W. & A.; see *Kandelia candel* (L.) Druce
Kanilia caryophylloides Bl.; see *Bruguiera cylindrica* (L.) Bl.
Kanilia parviflora Bl.; see *Bruguiera parviflora* (Roxb.) W.& A. *ex* Griff.
Kerinozoma cheribon Steud.; see *Xerochloa imberbis* R. Br.
Kerinozoma collina Zoll.; see *Xerochloa imberbis* R. Br.
Kerinozoma littoralis Zoll.; see *Xerochloa imberbis* R. Br.
Kerinozoma suraboja Steud..; see *Xerochloa imberbis* R. Br.
***Kleinhovia hospita* L.. – 262**
Kleinhovia serrata Blanco; see *Kleinhovia hospita* L..
Lagondium vulgare Rumph.; see *Vitex ovata* Thunb.
Laguncularia purpurea Gaud.; see *Lumnitzera littorea* (Jack) Voigt.
Languncularia rosea Gaud.; see *Lumnitzera racemosa* Willd.
Lasia aculeata Lour.; see *Lasia spinosa* (L.) Thwaites.
Lasia crassifolia Engl.; see *Lasia spinosa* (L.) Thwaites.
Lasia descisens Schott.; see *Lasia spinosa* (L.) Thwaites.
Lasia heterophylla Schott.; see *Lasia spinosa* (L.) Thwaites.
Lasia roxburgii Griff.; see *Lasia spinosa* (L.) Thwaites.
***Lasia spinosa* (L.) Thwaites. – 60**
Lasia zollingeri Schott.; see *Lasia spinosa* (L.) Thwaites.
Lasiostoma auct. non Schreber *Myrmecodia echinata*; see *Myrmecodia tuberosa* DC.
Lecanopteris sinuosa Copel.; see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Lens phaseoloides L.; see *Entada phaseoloides* (L.) Merr.
***Leptochloa neesii* (Thw.) Bth. – 44**
Leptochloa panicea (Retz.) Ohwi; see *Leptochloa neesii* (Thw.) Bth.
Leptochloa polystachya Retz..; see *Leptochloa neesii* (Thw.) Bth.
Leptochloa wightiana Nees ex Steud.; see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Leptocionium affine v.d. B.; see *Hymenophyllum holochilum* (Bosch) C. Chr.
Leptocionium holochilum (Bosch) Bosch; see *Hymenophyllum holochilum* (Bosch) C. Chr.
Lerchena maritima (L.) Kuntze.; see *Suaeda maritima (L.) Dum.*
Leucostegia parvula J. Sm.; see *Davallia parvula* Wall. ex Hook. & Grev.
Licuala horrida; see *Licuala spinosa* Wurmb.
Licuala spinosa Poir.; see *Licuala spinosa* Wurmb.
Licuala spinosa Thunb.; see *Licuala spinosa* Wurmb.
Licuala spinosa var. cochinchinensis Becc.; see *Licuala spinosa* Wurmb.
***Licuala spinosa* Wurmb. – 134**
Lignum equinum Rumph.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Limacia monilifera; see *Hypserpa polyandra* Becc.
Lindsaya acutifolia Desv.; see *Nephrolepis acutifolia* (Desv.) H. Christ.
Lindsaya lanuginosa Wall. ex Hook.; see *Nephrolepis acutifolia* (Desv.) H. Christ.

Litsea tersa; see *Brownlowia tersa* (L.) Kosterm.
Livistona cochinchinensis; see *Corypha saribus* Lour.
Livistona saribus (Lour.) Merr. *ex* Chev.; see *Corypha saribus* Lour.
Lobelia frutescens Mill.; see *Scaevola taccada* (Gaertn.) Roxb.
Lobelia plumieri (*non* L.) Burm.; see *Scaevola taccada* (Gaertn.) Roxb.
Lobelia taccada Gaertn.; see *Scaevola taccada* (Gaertn.) Roxb.
Locandia glandulifera Pierre; see *Quassia indica* (Gaertn.) Nooteboom
Locandia harmandii Pierre ; see *Quassia harmandiana* (Pierre) Nooteboom
Locandia indica O.K.; see *Quassia indica* (Gaertn.) Nooteboom
Locandia madagascariensis O.K.; see *Quassia indica* (Gaertn.) Nooteboom
Locandia mekongensis Pierre; see *Quassia indica* (Gaertn.) Nooteboom
Locandia merguensis Pierre; see *Quassia indica* (Gaertn.) Nooteboom
Locandia pendula Pierre; see *Quassia indica* (Gaertn.) Nooteboom
***Loeseneriella macrantha* (Korth.) A.C. Smith – 109**
Lomaria mollis Zoll; see *Photinopteris speciosa* (Bl.) Persl.
Lomaria scandens (Sw.) Willd.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Lomaria speciosa Bl.; see *Photinopteris speciosa* (Bl.) Persl.
Lomariopsis palustris (Burm.f.) Kuhn.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Lomariopsis scandens (Sw.) Mett.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Lonchitis volubilis Rumph.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Lonchocarpa pterocarpus DC.; see *Derris scandens* (Aubl.) Pittier
Lonchocarpa scandens (Aubl.) Ducke.; see *Derris scandens* (Aubl.) Pittier
Lophopyxis combretocarpa (Boerl.) Engl.; see *Lophopyxis maingayi* Hook.f.
***Lophopyxis maingayi* Hook.f. – 125**
Lophopyxis pentaptera (K. Sch.) Engl.; see *Lophopyxis maingayi* Hook.f.
Lophopyxis schumannii Boerl.; see *Lophopyxis maingayi* Hook.f.
Loranthus ampullaceus Roxb.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus carinatulus D.C.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus cochinchinensis Lour.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus crassus Hook. *f.*; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus cycnei-sinus; see Amyema mackayense (Blakely) Danser
Loranthus farinaceous Griff.; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus flavus Bl.; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus globosus Roxb.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus mackayensis Blakely*; see Amyema mackayense* (Blakely) Danser
Loranthus obovatus Schröt. & Back.; see *Amyema gravis* Danser
Loranthus oleoides D.C.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus pallens D.C.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus patulus Jack.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus pentandrus L.; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus shawianus Elm.; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus sphaeocarpus Bl.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus sphaerocephalus Wurth.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus subglobosus D.C.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus subumbellatus Bl.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus tribracteatus Ridl.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus venosus Bl.; see *Dendrophthoe pentandra* (L.) Miq.
Loranthus viridiflorus Wall.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Loranthus zimmermanni Warb.; see *Dendrophthoe pentandra* (L.) Miq.
***Loxogramma involuta* Presl. – 15**

Lumnitzera coccinea W. & A.; see *Lumnitzera littorea* (Jack) Voigt.
***Lumnitzera littorea* (Jack) Voigt. – 167**
Lumnitzera purpurea Presl.; see *Lumnitzera littorea* (Jack) Voigt.
Lumnitzera racemosa var. lutea Gaud.; see *Lumnitzera racemosa* Willd.
Lumnitzera racemosa var. pubescens Koord. & Vahl.; see *Lumnitzera racemosa* Willd.
Lumnitzera racemosa var. racemosa Willd.; see *Lumnitzera racemosa* Willd.
***Lumnitzera racemosa* Willd. – 168**
Lumnitzera rosea Presl.; see *Lumnitzera racemosa* Willd.
***Lycopodium carinatum* Desv. – 10**
Lycopodium laxum Spring.; see *Lycopodium carinatum* Desv.
Lythrum pemphis L.; see *Pemphis acidula* J.R. & G. Forst.
Maba buxifolia (Rottb.) Juss.; see *Diospyros ferrea* (Willd.) Bakh.
Maba buxifolia Pers.; see *Diospyros ferrea* (Willd.) Bakh.
Maba cumingiana A.DC.; see *Diospyros maritima* Blume
Maba ebenus Spreng.; see *Diospyros ferrea* (Willd.) Bakh.
Maba ferrea (Willd.) Aubév.; see *Diospyros ferrea* (Willd.) Bakh.
Maba guineensis (Schumach. & Thonn.) A.DC.; see *Diospyros ferrea* (Willd.) Bakh.
Maba papuana (R.Br.) Kosterm.; see *Diospyros maritima* Blume
Maba madagascarensis A.DC.; see *Diospyros ferrea* (Willd.) Bakh.
Maba smeathmannii A.DC.; see *Diospyros ferrea* (Willd.) Bakh.
Macrolobium amboinensis Teijsm. *ex* Hassk.; see *Intsia bijuga* (Colebr.) Kuntze
Macrolobium bijugum Colebr.; see *Intsia bijuga* (Colebr.) Kuntze
***Macrosolen cochinchinensis* (Lour.) Tiegh. – 87**
Macrosolen tribracteatus Dans.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Macrostomium aloefolium; see *Dendrobium aloefolium* (Bl.) Rchb.f.
Malapoenna tersa; see *Brownlowia tersa* (L.) Kosterm.
Malaspinae lamifolia Presl. ; see *Aegiceras corniculatum* (L.) Blanco
Malaxis iridifolia (Lindl.) Rchb. f.; see *Oberonia iridifolia* Lindl.
Mallotus tokbrai (Bl.) Muell.; see *Blumeodendron tokbrai* (Bl.) Kurz.
Mallotus vernicosus (Hook. f.) Gage; see *Blumeodendron tokbrai* (Bl.) Kurz.
Malvaviscus populneus (L.) Gaertn.; see *Thespesia populnea* (L.) Soland. ex Correa
Mammea asiatica Linne; see *Barringtonia asiatica* (L.) Kurz
Mangifera xylocarpa Laut.; see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Mangium candelarium Rumph.; see *Rhizophora apiculata* Bl. and *Rhizophora mucronata* Lam.
Mangium caryophylloides Rumph.; see *Bruguiera cylindrica* (L.) Bl. and *Ceriops tagal* (Perr.) C.B.Rob.
Mangium caseolare album Rumph.; see *Sonneratia alba* J.E. Smith
Mangium caseolare rubrum Rumph.; see *Sonneratia caseolaris* (L.) Engl.
Mangium celsum Rumph.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Mangium digitatum Rumph.; see *Bruguiera sexangula* (Lour.) Poir.
Mangium ferreum Rumph.; see *Pemphis acidula* J.R. & G. Forst.
Mangium minus Rumph.; see *Bruguiera cylindrica* (L.) Bl. and *Bruguiera gymnorrhiza* (L.) Lamk.
Mangium procellanicum Rumph.; see *Pemphis acidula* J.R. & G. Forst.
Manungala pendula Blanco; see *Quassia indica* (Gaertn.) Nooteboom
Mariscus compactus Boldingh; see *Cyperus compactus* Retz.
Mariscus dilutus Nees; see *Cyperus compactus* Retz.
Mariscus javanicus Merr. & Metc; see *Cyperus javanicus* Houtt.
Mariscus microcephalus Presl.; see *Cyperus compactus* Retz.
Mariscus pennatus Domin.; see *Cyperus javanicus* Houtt.
Mariscus stuppeus Merr..; see *Cyperus javanicus* Houtt.
Marquartia leucacantha; see *Pandanus tectorius* Sol

Mauduita penduliflora Comm.; see *Quassia indica* (Gaertn.) Nooteboom
***Maytenus emarginata* (Willd.) Ding Hou – 164**
Meiena axillaris Rafin.; see *Dendrophthoe pentandra* (L.) Miq.
***Melaleuca cajuputi* Roxb. – 221**
Melaleuca cajuputi subsp. cajuputi Roxb.; see *Melaleuca cajuputi* Roxb.
Melaleuca cajuputi subsp. cumingiana (Turcz.) Barlow; see *Melaleuca cajuputi* Roxb
Melaleuca leucadendra L.; see *Melaleuca cajuputi* Roxb
Melaleuca leucadendron (sensu lato); see *Melaleuca cajuputi* Roxb
Melanium fruticosum Spreng.; see *Pemphis acidula* J.R. & G. Forst.
Melastoma adpressum Wall., *ex* Triana; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma affine D.Don.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma asperum Bl.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma baumianum Naud.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma candidum D.Don.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma constrictum Blume; see *Pachycentria constricta* (Bl.) Blume
Melastoma imbricatum var. *longipes* Craib.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma malabathricum var. *grandiflorum* Craib.; see *Melastoma malabathricum* var. *malabathricum* L.
***Melastoma malabathricum* var. *malabathricum* L. – 205**
Melastoma malabathricum var. *polyanthum* (Bl.) Benth.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma oliganthum Naud.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma polyanthemum (Bl.) G.Don.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma polyanthum Blume; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma polyanthum Burm.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma pusillum Bl.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma royeni Bl.; see *Melastoma malabathricum* var. *malabathricum* L.
***Melastoma saigonense* (Kuntze) Merr. – 206**
Melastoma scabrum Ridl.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma setigerum Bl.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma tondanense Bl.; see *Melastoma malabathricum* var. *malabathricum* L.
Melastoma villosum Sims [non Aublet]; see *Melastoma saigonense* (Kuntze) Merr.
Menispermum cocculus L.; see *Anamirta cocculus* L. Wight & Arn.
Menispermum lacunosum Lamk.; see *Anamirta cocculus* L. Wight & Arn.
Meringium holochilum (Bosch) Copel.; see *Hymenophyllum holochilum* (Bosch) C. Chr.
***Merope angulata* (Willd.) Swingle – 247**
Merope spinosa; see *Merope angulata* (Willd.) Swingle
***Merrilliodendron megacarpum* (Hemsl.) Sleum. – 185**
Merrilliodendron rotense Kanehe; see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Millania rupestre Zipp.; see *Pemphis acidula* J.R. & G. Forst.
Millettia pinnata; see *Pongamia pinnata* (L.) Pierre
Mimosa corcondiana Roxb.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Mimosa scandens L.; see *Entada phaseoloides* (L.) Merr.
Mimosa umbellata Vahl.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Mischocarpus lessertianus Ridley ; see *Mischocarpus sundaicus* Blume
Mischocarpus oppositifolius auct. non (Lour.) Merr. ; see *Mischocarpus sundaicus* Blume
Mischocarpus pyriformis auct. non Radlk. ; see *Mischocarpus sundaicus* Blume
***Mischocarpus sundaicus* Blume – 250**
Mischocarpus vulcanicus Elmer *ex* Merrill; see *Mischocarpus sundaicus* Blume
Monetia barlerioides (*non* L'Hér) Miq.; see *Azima sarmentosa* (Bl.) B. & H.
Monetia sarmentosa Baill.; see *Azima sarmentosa* (Bl.) B. & H.

Monosoma littorata Griff.; see *Xylocarpus granatum* Koen.
Morinda citrifolia Hunter; see *Morinda citrifolia* L.
***Morinda citrifolia* L. – 243b**
***Mucuna gigantea* (Willd.) DC. – 124**
***Myoporum bontioides* (Siebold & Zucc.) A. Gray – 214**
***Myriostachya wightiana* (Nees ex Steud.) Hook.f. – 45**
Myriostachya wightiana var. *longispiculata* Hook.f.; see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Myriostachya wightiana var. *wightiana*; see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Myristica albertisii Warb.; see *Myristica hollrungii* Warb.
Myristica euryocarpa Warb.; see *Myristica hollrungii* Warb.
Myristica globularia Blume; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica heterophylla K. Schum; see *Myristica hollrungii* Warb.
***Myristica hollrungii* Warb. – 216**
Myristica irya Gaertn.; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica javanica Blume; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica lemanniana A. DC.; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica micrantha Wall.; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica sphaerocarpa Wall.; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica subglobosa Miq.; see *Horsfieldia irya* (Gaertn.) Warb.
Myristica vrieseana Miq.; see *Horsfieldia irya* (Gaertn.) Warb.
Myrmecodia armata; see *Myrmecodia tuberosa* DC.
Myrmecodia rumphii Becc.; see *Myrmecodia tuberosa* DC.
***Myrmecodia tuberosa* DC. – 102**
***Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito – 16**
Myrobalanus catappa Kuntze; see *Terminalia catappa* L.
Myrsine avensis (Blume) Mez.; see *Rapanea porteriana* Wall. *ex* A. DC.
Myrsine porteriana Wall. *ex* A. DC.; see *Rapanea porteriana* Wall. *ex* A. DC.
Myrsine umbellulata A. DC.; see *Rapanea porteriana* Wall. *ex* A. DC.
Nageia polystachyus (R.Br. ex Endl.); see *Podocarpus polystachyus* R.Br. *ex* Endl.
Nageia thevetiaefolia (Blume) F.v.M.; see *Podocarpus polystachyus* R.Br. *ex* Endl.
***Najas browniana* Rendle – 69**
Najas falciculata A. Braun.; see *Najas indica* (Willd.) Cham
Najas foveolata A.Br.; see *Najas indica* (Willd.) Cham
***Najas indica* (Willd.) Cham. – 70**
Najas intermedia Gorski; see *Najas marina* L. *var. marina*
Najas kingii Kingi; see *Najas indica* (Willd.) Cham
Najas lacerata Rendle; see *Najas indica* (Willd.) Cham
Najas lobata Blanco; see *Najas indica* (Willd.) Cham
Najas major All.; see *Najas marina* L. *var. marina*
Najas marina var. angustifolia et intermedia Rendle; see *Najas marina* L. *var. marina*
***Najas marina* L. *var. marina* – 71**
Najas minor var. indica A. Br.; see *Najas indica* (Willd.) Cham
Najas palustris Blanco; see *Najas indica* (Willd.) Cham
Najas tenuifolia (*non* R.Br.) Miq.; see *Najas indica* (Willd.) Cham
Neesia altissima (non Bl.) F.Vill.; see *Camptostemon philippinense* (Vidal) Becc.
Neottopteris maritania Fée; see *Asplenium nidus* Linn.
Neottopteris musaefolia J.Sm.; see *Asplenium nidus* Linn.
Neottopteris nidus (L.) J.Sm.; see *Asplenium nidus* Linn.
Neottopteris rigida Fée; see *Asplenium nidus* Linn.
***Nephrolepis acutifolia* (Desv.) H. Christ. – 11**

Neuroplatyceros biformis Fée.; see *Platycerium coronarium* (Koenig.) Desv.
Nidus formicarum niger Rumph.; see *Hydnophytum formicarum* Jack
Nidus formicarum ruber Rumph.; see *Myrmecodia tuberosa* DC.
Niota commersonii Pers.; see *Quassia indica* (Gaertn.) Nooteboom
Niota lamarckiana Bl.; see *Quassia indica* (Gaertn.) Nooteboom
Niota lucida Wall.; see *Quassia indica* (Gaertn.) Nooteboom
Niota pentapetala Poir.; see *Quassia indica* (Gaertn.) Nooteboom
Niota polyandra; see *Brownlowia tersa* (L.) Kosterm.
Niota tetrapetala Poir.; see *Quassia indica* (Gaertn.) Nooteboom
Niphobolus acrostichoides (G. Forst.) A.Richt.; see *Pyrrosia longifolia* (Burm.) Morton.
Niphobolus cinnamomeus; see *Pyrrosia longifolia* (Burm.) Morton.
Niphobolus fissus Bl.; see *Pyrrosia longifolia* (Burm.) Morton.
Niphobolus longifolium Spr.; see *Pyrrosia longifolia* (Burm.) Morton.
Niphobolus puberulus Bl.; see *Pyrrosia longifolia* (Burm.) Morton.
Nothopanax macgillivrayi Seem.; see *Polyscias macgillivrayi* (Seem.) Harms.
Notochlaena piloselloides Kaulf.; see *Drymoglossum piloselloides* (Linn.) Presl.
Novella litorea Rumph.; see *Thespesia populnea* (L.) Soland. ex Correa
Novella nigra Rumph.; see *Cordia subcordata* Lam.
Novella repens; see *Hibiscus tiliaceus* L.
Novella rubra; see *Hibiscus tiliaceus* L.
Nugae silvarum Rumph.; see *Caesalpinia crista* L.
Nummularia lactea minor Rumph.; see *Dischidia nummularia* R.Br.
Nyctanthes hirsuta Linn.; see *Guettarda speciosa* Linn.
Nypa fructicans Thunb.; see *Nypa fruticans* Wurmb.
***Nypa fruticans* Wurmb. – 135**
Oberonia bertoldii; see *Oberonia laeta* J.J.S.
Oberonia gracillima; see *Oberonia laeta* J.J.S.
***Oberonia iridifolia* Lindl. – 98**
***Oberonia laeta* J.J.S. – 99**
***Oberonia rhizophoreti* Schltr. – 100**
Oberonia rhizophoreti J.J. Sm.; see *Oberonia rhizophoreti* Schltr
Ochthocharis attenuata Backh. f.; see *Ochthocharis bornensis* Bl.
Ochthocharis borneensis (sic); see *Ochthocharis bornensis* Bl.
***Ochthocharis bornensis* Bl. – 207**
Ochthocharis buruensis T. & B.; see *Ochthocharis bornensis* Bl.
Ochthocharis javanica (haud Bl.); see *Ochthocharis bornensis* Bl.
Oetosis piloselloides O.K.; see *Drymoglossum piloselloides* (Linn.) Presl.
***Olax imbricata* Roxb. – 223**
Olax laxiflora Ridl.; see *Olax imbricata* Roxb.
Olax multiflora A. Rich.; see *Olax imbricata* Roxb.
Olax multiflora Ridl.; see *Olax imbricata* Roxb.
Olax rosea Ridl.; see *Olax imbricata* Roxb.
Olax semiinfera Valet.; see *Olax imbricata* Roxb.
Olax wightiana Wall. ex Wight & Arn.; see *Olax imbricata* Roxb.
Olfersia blumeana Presl.; see *Elaphoglossum amblyphyllum* C.R. Bell.
Olfersia decurrens Presl.; see *Elaphoglossum amblyphyllum* C.R. Bell.
Olfersia scandens (Willd.) C. Presl.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Olus calappoides Rumph.; see *Cycas rumphii* Miq.
Olus crepitans Rumph.; see *Finlaysonia obovata* Wall.
Oncosperma filamentosa Blume; see *Oncosperma tigillarium* (Jack.) Ridl.

Oncosperma filamentosum Blume; see *Oncosperma tigillarium* (Jack.) Ridl.
***Oncosperma tigillarium* (Jack.) Ridl. – 136**
Oncospermum tigillaria (Jack.) Ridl..; see *Oncosperma tigillarium* (Jack.) Ridl.
Onoclea scandens Sw.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Onychium subulatum Bl.; see *Dendrobium subulatum* (Bl.) Lindl.
Oporum serra; see *Dendrobium aloefolium* (Bl.) Rchb.f.
Ornitrophe integrifolia Willd.; see *Allophylus cobbe* (L.) Raeusch.
Ornitrophe glabra Roxb.; see *Allophylus cobbe* (L.) Raeusch.
Ornitrophe repanda Roxb.; see *Allophylus cobbe* (L.) Raeusch.
Ornitrophe villosa Roxb.; see *Allophylus cobbe* (L.) Raeusch.
Orxera cornuta Raf.; see *Aerides odoratum* Reinw. *ex* Blume
Osbeckia royeni (Bl.) Miq.; see *Melastoma malabathricum* var. *malabathricum* L.
Osbeckia saigonense Kuntze; see *Melastoma saigonense* (Kuntze) Merr.
***Osbornia octodonta* F.v.Muell. – 222**
Osmunda coronaria J. König; see *Platycerium coronarium* (Koenig.) Desv.
Outea bijuga DC.; see *Intsia bijuga* (Colebr.) Kuntze
***Oxystelma carnosum* R. Br. – 105**
***Pachycentria constricta* (Bl.) Blume – 89**
Pachycentria cordata Blume; see *Pachycentria constricta* (Bl.) Blume
Pachycentria elliptica Blume; see *Pachycentria constricta* (Bl.) Blume
Pachycentria formicaria Merr.; see *Pachycentria constricta* (Bl.) Blume
Pachycentria javanensis Hochr.; see *Pachycentria constricta* (Bl.) Blume
Pachycentria junghuhniana Miq.; see *Pachycentria constricta* (Bl.) Blume
Pachycentria lanceolata O.Schwartz; see *Pachycentria constricta* (Bl.) Blume
Pachycentria laxiflora Blume; see *Pachycentria constricta* (Bl.) Blume
Pachycentria macrorhiza Becc.; see *Pachycentria constricta* (Bl.) Blume
Pachycentria oligosperma O.Schwartz; see *Pachycentria constricta* (Bl.) Blume
Pachycentria rigida Blume; see *Pachycentria constricta* (Bl.) Blume
Pachycentria tuberculata Korth.; see *Pachycentria constricta* (Bl.) Blume
Pachycentria varingiaefolia; see *Pachycentria constricta* (Bl.) Blume
Pachycentria zollingeriana Naudin; see *Pachycentria constricta* (Bl.) Blume
***Pachypleuria angustata* (Wall. ex Hook. & Grev.) J. Sm. – 6**
Panax grandifolia Volkens; see *Polyscias macgillivrayi* (Seem.) Harms.
Panax macgillivrayi (Seem.) Benth.; see *Polyscias macgillivrayi* (Seem.) Harms.
Pandanus fascicularis; see *Pandanus tectorius* Sol
Pandanus foetidus; see *Pandanus tectorius* Sol
Pandanus inermis Reinw.; see *Pandanus tectorius* Sol
Pandanus laevis Kunth.; see *Pandanus tectorius* Sol
Pandanus littoralis Jungh.; see *Pandanus tectorius* Sol
Pandanus moschatus Miq.; see *Pandanus tectorius* Sol
Pandanus odoratissimus Park.; see *Pandanus tectorius* Sol
Pandanus odoratus Salisb.; see *Pandanus tectorius* Sol
Pandanus odorifer (Forssk.) Kuntze; see *Pandanus tectorius* Sol
***Pandanus tectorius* Sol – 139**
Pandanus versus; see *Pandanus tectorius* Sol
Panicum dactylon L.; see *Cynodon dactylon* (L.) Pers.
Paramignya angulata (Willd.) Burkill; see *Merope angulata* (Willd.) Swingle
Paramignya longispina Hk.; see *Merope angulata* (Willd.) Swingle
Paratropia micrantha Miq. ; see *Schefflera elliptica* (Blume) Harms.
Parechites bowringii Hance.; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green

Parinarium amboinense Teijsm. & Binn.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium curranii; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium elatum King.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium glaberimmum Hassk.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium hahlii Warb.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium lanceolatum Teijsm.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium laurinum A. Gray.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium macrophyllum T. & B.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium margarata A. Gray; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium mindanaense Perk.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium scabrum Hassk.; see *Atuna racemosa ssp. racemosa* Rafin.
Parinarium warburgii Perk. *ex* Merr.; see *Atuna racemosa ssp. racemosa* Rafin.
Paritium tiliaceum (L.) St. Hil.; see *Hibiscus tiliaceus* L.
***Paspalum vaginatum* Sw. – 46**
Paspalum distichum sensu Ridley; see *Paspalum vaginatum* Sw.
Paspalum littorale.; see *Paspalum vaginatum* Sw.
***Passiflora foetida* L. – 72**
Paulinia seriana auct. non L.: Burm *F., Rhus cobbe* L.; see *Allophylus cobbe* (L.) Raeusch.
Pedicellia sundaica Pierre; see *Mischocarpus sundaicus* Blume
Peekeliodendron missionariorum Sleum.; see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Peltophorum ferruginea Decne.; see *Peltophorum pterocarpum* (DC.) K. Heyne
Peltophorum ferrugineum (Decne.) Benth.; see *Peltophorum pterocarpum* (DC.) K. Heyne
Peltophorum inerme Nav.; see *Peltophorum pterocarpum* (DC.) K. Heyne
Peltophorum inermis Roxb.; see *Peltophorum pterocarpum* (DC.) K. Heyne
***Peltophorum pterocarpum* (DC.) K. Heyne – 198**
Peltophorum pterocarpum (DC.) Backer ex Heyne; see *Peltophorum pterocarpum* (DC.) K. Heyne
***Pemphis acidula* J.R. & G. Forst. – 202**
Pemphis angustifolia Roxb.; see *Pemphis acidula* J.R. & G. Forst.
Pemphis setosa Blanco; see *Pemphis acidula* J.R. & G. Forst.
Pentacoelium bontioides Sieb. et Zucc.; see *Myoporum bontioides* (Siebold & Zucc.) A. Gray
Petaloma alba Blanco; see *Lumnitzera racemosa* Willd.
Petaloma coccinea Blanco; see *Lumnitzera littorea* (Jack) Voigt.
Petrocarya glaberrima (Hassk.) Miers.; see *Atuna racemosa ssp. racemosa* Rafin.
Petrocarya scabra (Hassk.) Miers..; see *Atuna racemosa ssp. racemosa* Rafin.
Phaseolus maritimus purguns Aubl.; see *Canavalia maritima* Thouars
Phlegmariurus carinatus (Desv.) Ching.; see *Lycopodium carinatum* Desv.
Phoberos macrophylla W. & A.; see *Scolopia macrophylla* (W. & A.) Clos
Phoberos maritima Miq.; see *Scolopia macrophylla* (W. & A.) Clos
Phoberos rhinanthera Benn. & Br.; see *Scolopia macrophylla* (W. & A.) Clos
***Phoenix paludosa* Roxb. – 137**
Photinopteris acuminata (Willd.) C.V. Morton; see *Photinopteris speciosa* (Bl.) Persl.
Photinopteris horsfieldii J. Sm.; see *Photinopteris speciosa* (Bl.) Persl.
Photinopteris rigida Bedd.; see *Photinopteris speciosa* (Bl.) Persl.
***Photinopteris speciosa* (Bl.) Persl. – 17**
Phragmites communis sensu Ridley; see *Phragmites karka* (Retz.) Trin. ex Steud.
Phragmites filiformis; see *Phragmites karka* (Retz.) Trin. ex Steud.
***Phragmites karka* (Retz.) Trin. ex Steud. – 47**
Phragmites roxburghii; see *Phragmites karka* (Retz.) Trin. ex Steud.
Phyllanthus litoralis [sic] (Bl.) Muell.; see *Glochidion littorale* Bl.
Phyllitis arborea Rumph.; see *Asplenium nidus* Linn.

***Phymatodes scolopendria* (Burm.) Ching. – 18**
Phymatodes sinuosa (Wall.) J. Sm.; see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Phymatodes sinuosa Wall. ex Hook.; see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Phymatodes vulgare Presl.; see *Phymatodes scolopendria* (Burm.) Ching.
Phymatosorus scolopendria (Burm.) Pichi Serm.; see *Phymatodes scolopendria* (Burm.) Ching.
Pimecaria odorata Raf.; see *Ximenia americana* L.
Pisonia buxifolia Rottb.; see *Diospyros ferrea* (Willd.) Bakh.
Pithecellobium malayanum Pierre; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Pithecellobium moniliferum Miq.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Pithecellobium umbellatum (Vahl) Bth.; see *Cathormion umbellatum* (M.Vahl.) Kosterm.
***Planchonella obovata* (R.Br.) Pierre. – 251**
Platycerium biforme (Sw.) Blume; see *Platycerium coronarium* (Koenig.) Desv.
***Platycerium coronarium* (Koenig.) Desv. – 19**
Pleopeltis heterocarpa v.A.bv. R.; see *Selliguea heterocarpa* Blume
Pleopeltis phymatodes Moore; see *Phymatodes scolopendria* (Burm.) Ching.
Pleopeltis schoutenii v.A.v.R.; see *Selliguea heterocarpa* Blume
Pleopeltis sinuosa (Wall. ex Hook.) Bedd.; see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Pluchea leptophylla Hong & Chen; see *Pluchea pteropoda* Hemsl.
***Pluchea indica* (L.) Less. – 148**
***Pluchea pteropoda* Hemsl. – 149**
Poa panicea Retz.; see *Leptochloa neesii* (Thw.) Bth.
Podocarpus neriifolius D.Don.; see *Podocarpus polystachyus* R.Br. *ex* Endl.
***Podocarpus polystachyus* R.Br. *ex* Endl. – 227**
Podocarpus thevetiifolia Blume; see *Podocarpus polystachyus* R.Br. *ex* Endl.
Podocarpus thevetiifolius D.Don.; see *Podocarpus polystachyus* R.Br. *ex* Endl.
Pogonanthera pulverulenta; see *Pachycentria constricta* (Bl.) Blume
Polypodium acrostichoides G. Forst.; see *Pyrrosia longifolia* (Burm.) Morton.
Polypodium cinnamomeus; see *Pyrrosia longifolia* (Burm.) Morton.
Polypodium decorum; see *Ctenopteris moultoni* (Copel.) C. Christ. & Tardieu
Polypodium diversifolium R. Br.; see *Drynaria rigidula* (Sw.) Bedd.
Polypodium forbesii v.A.a.R.; see *Phymatodes scolopendria* (Burm.) Ching.
Polypodium gaudichaudi Bory.; see *Drynaria rigidula* (Sw.) Bedd.
Polypodium heterocarpum Mett.; see *Selliguea heterocarpa* Blume
Polypodium linnaei Bory; see *Drynaria sparsisora* (Desv.) Moore
Polypodium mettenianum Cesati; see *Selliguea heterocarpa* Blume
Polypodium moultoni Copel.; see *Ctenopteris moultoni* (Copel.) C. Christ. & Tardieu
Polypodium palustre Burm.f.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Polypodium phymatodes L.; see *Phymatodes scolopendria* (Burm.) Ching.
Polypodium rigidulum Sw; see *Drynaria rigidula* (Sw.) Bedd.
Polypodium rigidum; see *Drynaria rigidula* (Sw.) Bedd.
Polypodium schoutenii v.A.v.R.; see *Selliguea heterocarpa* Blume
Polypodium scolopendria Burm.; see *Phymatodes scolopendria* (Burm.) Ching.
Polypodium scolopendrinum C. Chr.; see *Loxogramma involuta* Presl.
Polypodium sinuosum Wall. ex Hook.; see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Polypodium sparsisorum Desv.; see *Drynaria sparsisora* (Desv.) Moore
Polypodium speciosum Bl.; see *Drynaria rigidula* (Sw.) Bedd.
***Polyscias macgillivrayi* (Seem.) Harms. – 146**
Pongamia glabra Vent.; see *Pongamia pinnata* (L.) Pierre
Pongamia mitis Merr.; see *Pongamia pinnata* (L.) Pierre
***Pongamia pinnata* (L.) Pierre – 199**

Pongelia longiflora Rafin.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Portulaca axilliflora (*non* Pers.) Blanco; see *Trianthema portulacastrum* L.
Portulaca monogynum (L.) Medik.; see *Trianthema portulacastrum* L.
Portulaca portulacastrum L.; see *Sesuvium portulacastrum* (L.) L.
Portulaca toston Blanco; see *Trianthema portulacastrum* L.
Potamogeton filiformis Phil.; see *Ruppia maritima* L. *var. maritima*
Pothos heterophyllus Roxb.; see *Lasia spinosa* (L.) Thwaites.
Pouteria obovata (R. Br.) Baehni.; see *Planchonella obovata* (R.Br.) Pierre.
Problastes cuneifolia; see *Lumnitzera littorea* (Jack) Voigt.
Pseudaleia imbricata (Roxb.) Hassk.; see *Olax imbricata* Roxb.
Pseudaleia longistylis Hassk.; see *Olax imbricata* Roxb.
Premna abbreviata Miq.; see *Premna obtusifolia* R. Br.
Premna corymbosa (Burm. f.) Rottl. & Willd.; see *Premna obtusifolia* R. Br.
Premna cyclophylla Miq.; see *Premna obtusifolia* R. Br.
Premna foetida Reinw. ex Blume; see *Premna obtusifolia* R. Br.
Premna gaudichaudii Schau. ; see *Premna obtusifolia* R. Br.
Premna integrifolia L.; see *Premna obtusifolia* R. Br.
Premna laevigata Miq.; see *Premna obtusifolia* R. Br.
Premna littoralis K. & G.; see *Premna obtusifolia* R. Br.
Premna nitida K. Schum.; see *Premna obtusifolia* R. Br.
***Premna obtusifolia* R. Br. – 267**
Premna opulifolia Miq.; see *Premna obtusifolia* R. Br.
Premna ovalifolia Wall.; see *Premna obtusifolia* R. Br.
Premna ovata R.Br.; see *Premna obtusifolia* R. Br.
Premna sambucina Wall.; see *Premna obtusifolia* R. Br.
Premna scandens Boj.; see *Premna obtusifolia* R. Br.
Premna serratifolia Blanco; see *Premna obtusifolia* R. Br.
Premna serratifolia L.; see *Premna obtusifolia* R. Br.
Premna subcordata Turcz. ; see *Premna obtusifolia* R. Br.
Pteris piloselloides O.K.; see *Drymoglossum piloselloides* (Linn.) Presl.
Pteris scandens (Willd.) Roxb.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Pterocarpus flavus Lour.; see *Pongamia pinnata* (L.) Pierre
Pterocarpus guianensis (Benth.) Kuntze.; see *Derris scandens* (Aubl.) Pittier
Pterocarpus negrensis (Benth.) Kuntze.; see *Derris scandens* (Aubl.) Pittier
Pyrrhanthus littoreus Jack.; see *Lumnitzera littorea* (Jack) Voigt.
Pyrrosia acrostichoides G. Forst.; see *Pyrrosia longifolia* (Burm.) Morton.
***Pyrrosia longifolia* (Burm.) Morton. – 20**
Pyxipoma polyandrum Fenzl.; see *Sesuvium portulacastrum* (L.) L.
***Quassia harmandiana* (Pierre) Nooteboom – 252**
***Quassia indica* (Gaertn.) Nooteboom – 253**
Radix toxicaria.; see *Crinum asiaticum* L.
***Rapanea porteriana* Wall. *ex* A. DC. – 220**
Rhamnicastrum rhinanthera O. Ktze; see *Scolopia macrophylla* (W. & A.) Clos
Rhinanthera blumei Steud.; see *Scolopia macrophylla* (W. & A.) Clos
Rhizophora angula Lour.; see *Bruguiera sexangula* (Lour.) Poir.
***Rhizophora apiculata* Bl. – 237**
Rhizophora australis Steud.; see *Bruguiera sexangula* (Lour.) Poir.
Rhizophora candel (*non* L.) Blanco; see *Ceriops tagal* (Perr.) C.B.Rob.
Rhizophora candel Linné; see *Kandelia candel* (L.) Druce
Rhizophora candelaria DC.; see *Rhizophora apiculata* Bl.

Rhizophora candelaria Wight & Arn.; see *Rhizophora mucronata* Lam.
Rhizophora caryophylloides (*non* Burm. *f*) Griff.; see *Bruguiera hainessii* C.G.Rogers
Rhizophora caryophylloides Burm.; see *Bruguiera cylindrica* (L.) Bl.
Rhizophora caseolaris Linné; see *Sonneratia alba* J.E. Smith and *Sonneratia caseolaris* (L.) Engl.
Rhizophora ceratophylloides Gmel.; see *Bruguiera cylindrica* (L.) Bl.
Rhizophora conjugata (*non* Linné) Arn.; see *Rhizophora apiculata* Bl.
Rhizophora corniculata L.; see *Aegiceras corniculatum* (L.) Blanco
Rhizophora cylindrica (*non* L.) Roxb.; see *Bruguiera parviflora* (Roxb.) W.& A. *ex* Griff.
Rhizophora cylindrica Linné; see *Bruguiera cylindrica* (L.) Bl.
Rhizophora decandra Roxb.; see *Ceriops decandra* (Griff.) Ding Hou
Rhizophora eriopetala Steud.; see *Bruguiera sexangula* (Lour.) Poir.
Rhizophora glomerulata Zipp. *ex* Bl.; see *Ceriops decandra* (Griff.) Ding Hou
Rhizophora gymnorhiza L.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Rhizophora lamarckii; see *Rhizophora apiculata* Bl.
Rhizophora latifolia Miq.; see *Rhizophora mucronata* Lamk.
Rhizophora longissima Blanco; see *Rhizophora mucronata* Lamk.
Rhizophora macrorrhiza Griff.; see *Rhizophora mucronata* Lamk.
Rhizophora mangle (*non* Linné); see *Rhizophora apiculata* Bl.
Rhizophora mangle (*non* Linné) Roxb.; see *Rhizophora mucronata* Lamk.
***Rhizophora mucronata* Lamk. – 238**
Rhizophora mucronata var. stylosa Schimp.; see *Rhizophora stylosa* Griff.
Rhizophora mucronata var. typica Schimp.; see *Rhizophora mucronata* Lamk.
Rhizophora palun; see *Bruguiera gymnorrhiza* (L.) Lamk.
Rhizophora parviflora Roxb.; see *Bruguiera parviflora* (Roxb.) W.& A. *ex* Griff.
Rhizophora plicata Blanco; see *Bruguiera sexangula* (Lour.) Poir.
Rhizophora polyandra Blanco; see *Bruguiera sexangula* (Lour.) Poir.
Rhizophora rheedii Steud.; see *Bruguiera gymnorrhiza* (L.) Lamk.
Rhizophora sexangula; see *Bruguiera sexangula* (Lour.) Poir.
***Rhizophora stylosa* Griff. – 239**
Rhizophora tagal Perr.; see *Ceriops tagal* (Perr.) C.B.Rob.
Rhizophora timoriensis DC.; see *Ceriops tagal* (Perr.) C.B.Rob.
Rhizophora tinctoria Blanco; see *Bruguiera gymnorrhiza* (L.) Lamk.
Rhizphora lamarckii; see *Rhizophora stylosa* Griff.
***Rhododendron brookeanum* Low ex Lindl. *var. brookeanum* – 82**
***Ricinus communis* L. – 178**
Ricinus inermis Mill.; see *Ricinus communis* L.
Ricinus spectabilis Bl.; see *Ricinus communis* L.
Robinia mitis Linn.; see *Pongamia pinnata* (L.) Pierre
Rottlera tokbrai (Bl.) Scheff.; see *Blumeodendron tokbrai* (Bl.) Kurz.
Rumputris fasciculata Raf.; see *Cassytha filiformis* Linn.
Ruppia didyma Swartz ex Wickstr.; see *Ruppia maritima* L. *var. maritima*
Ruppia filifolia (Phil.) Skottstr.; see *Ruppia maritima* L. *var. maritima*
Ruppia marina Fries; see *Ruppia maritima* L. *var. maritima*
***Ruppia maritima* L. *var. maritima* – 73**
Ruppia pectinata Rydberg; see *Ruppia maritima* L. *var. maritima*
Ruppia rostellata W.D.J. Koch ex Rchb.; see *Ruppia maritima* L. *var. maritima*
Ryssopterys abutilifolia Jussieu; see *Ryssopterys timoriensis* (DC.) Jussieu
Ryssopterys albida Ryssopterys chrysantha (*non* Hassk.) Hochr.; see *Ryssopterys timoriensis* (DC.) Jussieu
Ryssopterys cumingana Jussieu; see *Ryssopterys timoriensis* (DC.) Jussieu

Ryssopterys dealbata Jussieu; see *Ryssopterys timoriensis* (DC.) Jussieu
Ryssopterys intermedia Hochr.; see *Ryssopterys timoriensis* (DC.) Jussieu
Ryssopterys microstema`Jussieu; see *Ryssopterys timoriensis* (DC.) Jussieu
***Ryssopterys timoriensis* (DC.) Jussieu – 126**
Ryssopterys timorensis var. tiliifolia (*non* Vent.) K. Sch. & Laut.; see *Ryssopterys timoriensis* (DC.) Jussieu
***Salacia chinensis* L. – 165**
Salacia latifolia Wall.; see *Salacia chinensis* L.
Salacia naumanni Engl.; see *Salacia chinensis* L.
Salacia littoralis Back.; see *Salacia chinensis* L.
Salacia kraemeri (*non* Loes.) Kanehira; see *Salacia chinensis* L.
Salacia patens Decne.; see *Salacia chinensis* L.
Salacia prinoides D.C.; see *Salacia chinensis* L.
Salacia socia Craib.; see *Salacia chinensis* L.
Salicornia australasica; see *Salicornia indica* Willd.
Salicornia brachiata; see *Salicornia indica* Willd.
Salicornia fruticosa; see *Salicornia indica* Willd.
Salicornia cinerea F.v.Muell.; see *Halocnemum cinereum* F.v.Muell.
***Salicornia indica* Willd. – 62**
Salsola indica Willd.; see *Suaeda maritima* (L.) Dum.
Salsola maritima (L.) Poir.; see *Suaeda maritima* (L.) Dum.
Samadera brevipetala Scheff.; see *Quassia indica* (Gaertn.) Nooteboom
Samadera glandulifera; see *Quassia indica* (Gaertn.) Nooteboom
Samadera harmandiana Pierre; see *Quassia harmandiana* (Pierre) Nooteboom
Samadera harmandiana (Pierre) Greshoff ; see *Quassia harmandiana* (Pierre) Nooteboom
Samadera harmandii Engl. ; see *Quassia harmandiana* (Pierre) Nooteboom
Samadera indica Gaertn.; see *Quassia indica* (Gaertn.) Nooteboom
Samadera madagascariensis A. Juss.; see *Quassia indica* (Gaertn.) Nooteboom
Samadera madagascariensis Gaertn.; see *Quassia indica* (Gaertn.) Nooteboom
Samadera mekongensis Pierre; see *Quassia indica* (Gaertn.) Nooteboom
Samadera pentapetala G.Don.; see *Quassia indica* (Gaertn.) Nooteboom
Samadera tetrapetala (Poir.) G. Don.; see *Quassia indica* (Gaertn.) Nooteboom
Samandura harmandiana Pierre ; see *Quassia harmandiana* (Pierre) Nooteboom
Samandura harmandii Pierre ; see *Quassia harmandiana* (Pierre) Nooteboom
Samandura indica Baill.; see *Quassia indica* (Gaertn.) Nooteboom
Sapium indicum Willd.; see *Excoecaria indica* (Willd.) Muell. Arg.
Sarcolobus banksii; see *Sarcolobus globosus* Wall.
Sarcolobus banksii Roem. & Schult.; see *Sarcolobus carinatus* Wall.
***Sarcolobus carinatus* Wall. – 106**
Sarcolobus globosa R. & S.; see *Sarcolobus globosus* Wall.
***Sarcolobus globosus* Wall. – 107**
Sarcolobus globosus subsp. *globosus*; see *Sarcolobus globosus* Wall.
Sarcolobus globosus subsp. *peregrinus* (Blanco) R.E. Rintz.; see *Sarcolobus globosus* Wall.
Scaevola frutescens; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola hainanensis – 181
Scaevola koenigii Vahl.; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola leschenaultii DC.; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola lobelia Murr.; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola macrocalyx de Vriese; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola piliplena Miq.; see *Scaevola taccada* (Gaertn.) Roxb.

Scaevola plumieri (*non* Vahl.) Bl.; see *Scaevola taccada* (Gaertn.) Roxb.
Scaevola sericea Vahl.; see *Scaevola taccada* (Gaertn.) Roxb.
***Scaevola taccada* (Gaertn.) Roxb. – 182**
Scaevola velutina Presl.; see *Scaevola taccada* (Gaertn.) Roxb.
***Schefflera elliptica* (Blume) Harms. – 75**
Schefflera elliptica var. *microphylla* Harms. ; see *Schefflera elliptica* (Blume) Harms.
***Schefflera lanceolata* Ridl. – 76**
Schefflera micrantha (Miq.) Ridley ; see *Schefflera elliptica* (Blume) Harms.
Schefflera minimiflora Ridley ; see *Schefflera elliptica* (Blume) Harms.
Schefflera musangensis Hend.; see *Schefflera ridleyi* (King) Viguier
Schefflera nitida Merr. ; see *Schefflera elliptica* (Blume) Harms.
***Schefflera ridleyi* (King) Viguier – 77**
Schefflera venulosa sensu Ridley ; see *Schefflera elliptica* (Blume) Harms.
Schefflera venulosa var. *curtisii* Ridley ; see *Schefflera elliptica* (Blume) Harms.
Scheffleropsis polyandra (Ridley) Ridley ; see *Schefflera ridleyi* (King) Viguier
Schmidelia bantamensis Blume; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia cobbe (L.) DC.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia fulvinervis Blume; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia glabra (Roxb.) Steud.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia grossedentata Turcz.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia javensis Blume; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia leptostachya Blume; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia ligustrina Blume ex Teijsm.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia littoralis Blume; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia macrophylla Zipp. ex Span.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia mutabilis Bl.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia obovata A. Gray; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia parviflora Zipp. ex Span.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia racemosa L.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia ternata (Forst. & Forst.) Cambess.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia timoriensis DC.; see *Allophylus cobbe* (L.) Raeusch.
Schmidelia tormentosa Hook.*f. Usubis triphylla* Burm. f.; see *Allophylus cobbe* (L.) Raeusch.
Schoberia linifolia Nutt. ex Moq.; see *Suaeda maritima* (L.) Dum.
Schoenoplectus grossus Pallas; see *Scirpus grossus* Linné
Schoenoplectus lacustris (L.) Pallas.; see *Scirpus lacustris* L.
Sciandophyllum elliptica Blume; see *Schefflera elliptica* (Blume) Harms.
Scirpus aemulans Steud.; see *Scirpus grossus* Linné
Scirpus arvensis Retz.; see *Fimbristylis ferruginea* (L.) Vahl
Scirpus ferrugineus L.; see *Fimbristylis ferruginea* (L.) Vahl
***Scirpus grossus* Linné – 38**
Scirpus grossus var. kysoor (*non* Clarke); see *Scirpus grossus* Linné
Scirpus kysoor (*non* Roxb.) Llanos.; see *Scirpus grossus* Linné
***Scirpus lacustris* L. – 39**
Scirpus lacustris (*non* L.) Merr.; see *Scirpus litoralis* Schrad.
Scirpus lacustris subsp. *validus* (Vahl.) T. Koyama; see *Scirpus lacustris* L.
***Scirpus litoralis* Schrad. – 40**
Scirpus littoralis (*sic*); see *Scirpus litoralis* Schrad.
***Scirpus maritimus* L – 41**
Scirpus maritimus var. aemulans Miq.; see *Scirpus grossus* Linné
Scirpus nanus (non Poir.) Spreng.; see *Eleocharis parvula* (R. & S.) Link ex Bluff
Scirpus parvulus R. & S.; see *Eleocharis parvula* (R. & S.) Link ex Bluff

Scirpus polytrichoides Retz.; see *Fimbristylis polytrichoides* (Retz.) R. Br.
Scirpus plantagineus Retz.; see *Eleocharis dulcis* (Burm. f.) Henschel
Scirpus pterolepis (Nees) Kunsch.; see *Scirpus lacustris* L.
Scirpus pusillus Vahl.; see *Eleocharis parvula* (R. & S.) Link ex Bluff
Scirpus spiralis Rottb.; see *Eleocharis spiralis* (Rottb.) R. & S.
Scirpus subulatus Vahl.; see *Scirpus litoralis* Schrad.
Scirpus thermalis Trab.; see *Scirpus litoralis* Schrad.
Scirpus triqueter var. *segregatus* Clarke; see *Scirpus lacustris* L.
Scirpus tuberosus Roxb.; see *Eleocharis dulcis* (Burm. f.) Henschel
Scirpus tumidus Roxb..; see *Eleocharis dulcis* (Burm. f.) Henschel
Scirpus validus Vahl.; see *Scirpus lacustris* L.
Scirpus validus (*non* Vahl.) Beetle.; see *Scirpus litoralis* Schrad.
Sclerostylis spinosa see *Merope angulata* (Willd.) Swingle
Scolopia crenata [non (Wall.) Clos.] King; see *Scolopia macrophylla* (W. & A.) Clos
***Scolopia macrophylla* (W. & A.) Clos – 179**
Scolopia maritima Warb.; see *Scolopia macrophylla* (W. & A.) Clos
Scolopia rhinanthera Clos; see *Scolopia macrophylla* (W. & A.) Clos
Scurrula pentandra & venosa G. Don.; see *Dendrophthoe pentandra* (L.) Miq.
Scyphiphora hydrophylacea; see *Scyphiphora hydrophyllacea* Gaertn. f.
***Scyphiphora hydrophyllacea* Gaertn. f. – 244**
Secamone maritima Bl.; see *Finlaysonia obovata* Wall.
Selliguea feei Bory; see *Selliguea heterocarpa* Blume
***Selliguea heterocarpa* Blume – 21**
Selliguea metteniana var lateritium (Baker) Tardieu & C.Chr.; see *Selliguea heterocarpa* Blume
Serianthes dilmyi Fosberg; see *Serianthes grandiflora* Bentham.
***Serianthes grandiflora* Bentham. – 200**
Sersalisia obovata R. Br.; see *Planchonella obovata* (R.Br.) Pierre.
***Sesuvium portulacastrum* (L.) L. – 55**
Sesuvium polyandrum Fenzl. *ex* Britt.; see *Sesuvium portulacastrum* (L.) L.
Sesuvium repens Willd.; see *Sesuvium portulacastrum* (L.) L.
Sideroxylon argentatum; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon bancanum; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon chrysophyllum; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon ferrugineum Hook. & Arn.; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon indicum; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon microcarpum Burck.; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon nodosum; see *Planchonella obovata* (R.Br.) Pierre.
Sideroxylon obovatum; see *Planchonella obovata* (R.Br.) Pierre.
Sinapistrum Rumph.; see *Lophopyxis maingayi* Hook.f.
Sindora conchinchinensis Baillon; see *Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen
Sindora maritima Pierre; see *Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen
Sindora siamensis Teijsm. ex Miq.; see *Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen
Sindora siamensis Teysm. ex Miq.; see *Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen
***Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen – 201**
Sindora wallichii var. siamensis (Teijsm.) Bak.; see *Sindora siamensis var. maritima* (Pierre) K. & SS. Larsen
***Smythea lanceata* (Tul.) Summerh. – 130**
Smythea pacifica Seem; see *Smythea lanceata* (Tul.) Summerh.
Soldanella marina indica Rumph.; see *Ipomoea pes-capre* (L.) Sweet.
Sonneratia acida Benth.; see *Sonneratia alba* J.E. Smith

Sonneratia acida Linné; see *Sonneratia caseolaris* (L.) Engl.
Sonneratia acida var. *griffithii* King.; see *Sonneratia griffithii* Kurz.
Sonneratia alba F.Vill.; see *Sonneratia alba* J.E. Smith
***Sonneratia alba* J.E. Smith – 254**
Sonneratia alba auct. plur. Watson; see *Sonneratia ovata* Back.
Sonneratia alba (*non* SM) Griff.; see *Sonneratia griffithii* Kurz.
***Sonneratia apetala* Buch.-Ham. – 255**
***Sonneratia caseolaris* (L.) Engl. – 256**
Sonneratia caseolaris Engl.; see *Sonneratia alba* J.E. Smith
Sonneratia evenia Bl.; see *Sonneratia caseolaris* (L.) Engl.
***Sonneratia griffithii* Kurz. – 257**
Sonneratia griffithii (*non* Kurz) Watson; see *Sonneratia alba* J.E. Smith
Sonneratia X *gulngai;* = hybrid of *Sonneratia caseolaris* (L.) Engl. and *Sonneratia alba* J.E. Smith
Sonneratia iriomotensis Masamune; see *Sonneratia alba* J.E. Smith
Sonneratia lanceolata Bl.; see *Sonneratia caseolaris* (L.) Engl.
Sonneratia mossambicensis Klotzsch *ex* Peters; see *Sonneratia alba* J.E. Smith
Sonneratia neglecta Bl.; see *Sonneratia caseolaris* (L.) Engl.
Sonneratia obovata Bl.,; see *Sonneratia caseolaris* (L.) Engl.
Sonneratia ovalis Korth.; see *Sonneratia caseolaris* (L.) Engl.
***Sonneratia ovata* Back. – 258**
Sonneratia pagatpat Blanco; see *Sonneratia caseolaris* (L.) Engl.
Sonneratia rubra; see *Sonneratia caseolaris* (L.) Engl.
Sophora heptaphylla L.; see *Aganope heptaphylla* (L.) Polhill
Spathodea diepenhorstii Miq.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Spathodea longiflora Vent. Choix.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Spathodea loureiriana DC.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Spathodea luzonica Blanco; see *Dolichandrone spathacea* (l.f.) K.Schum.
Spathodea rheedii Spreng.; see *Dolichandrone spathacea* (l.f.) K.Schum.
Sphaeromariscus microcephalus Camus.; see *Cyperus compactus* Retz.
Spilanthes acmella Blanco; see *Wedelia biflora* (L.) DC.
Spilanthes peregrina Blanco; see *Wedelia biflora* (L.) DC.
Spironema aphyllum (Forssk.) Raf.; see *Cassytha filiformis* Linn.
***Sporobolus virginicus* (L.) Kunth. – 48**
Stachytarpheta friedrichsthalii Hayek; see *Stachytarpheta jamaicensis* (L.) Vahl
***Stachytarpheta jamaicensis* (L.) Vahl – 74**
Stemmodontia biflora W.F. Wight; see *Wedelia biflora* (L.) DC.
***Stemonurus ammui* (Kaneh.) Sleum. – 186**
Stemonurus ellipticus (Schellenb.) Sleum.; see *Stemonurus ammui* (Kaneh.) Sleum.
***Stenochlaena palustris* (Burm. f.) Bedd. – 3**
Stenochlaena scandens (Sw.) J.Sm.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Sterculia cymbiformes Blanco; *Heritiera littoralis* Dryand.
Stillingia agallocha (L.) Baill.; see *Excoecaria agallocha* L.
Stillingia diversifolia; see *Excoecaria indica* (Willd.) Muell. Arg.
Stillingia indica (Willd.) Baill.; see *Excoecaria indica* (Willd.) Muell. Arg.
Stizolobium giganteum (Willd.)Sprengel; see *Mucuna gigantea* (Willd.) DC.
Suaeda indica Moq.; see *Suaeda maritima* (L.) Dum.
***Suaeda maritima* (L.) Dum. – 63**
Suaeda australis (R.Br.) Moq.; see *Suaeda maritima* (L.) Dum.
Suaeda nudiflora Moq.; see *Suaeda maritima* (L.) Dum.
Symplocos candicans Brand.; see *Symplocos celastrifolia* Griff. ex Clarke

***Symplocos celastrifolia* Griff. ex Clarke – 263**
Symplocos hutchinsonii Brand.; see *Symplocos celastrifolia* Griff. ex Clarke
Symplocos nigricans Brand.; see *Symplocos celastrifolia* Griff. ex Clarke
Symplocos peninsularis Brand.; see *Symplocos celastrifolia* Griff. ex Clarke
Syndesmis coarctata Griff.; see *Gluta velutina* Bl.
Tabernaemontana obtusifolia Poir.; see *Cerbera manghas* L.
Taenites piloselloides R. Br.; see *Drymoglossum piloselloides* (Linn.) Presl.
Tanghinia manghas (L.) G. Don.; see *Cerbera manghas* L.
Tarachia. canaliculata Presl.; see *Asplenium macrophyllum* Sw.
Tarachia falcata; see *Asplenium macrophyllum* Sw.
Tarachia oxyphylla Presl.; see *Asplenium macrophyllum* Sw.
Tecticornia australasica (Moq.) P.G. Wilson; see *Halocnemum cinereum* F.v.Muell.
Tecticornia cinerea F.v.Muell.; see *Halocnemum cinereum* F.v.Muell.
***Terminalia catappa* L. – 169**
Terminalia catappa var. chlorocarpa Hassk.; see *Terminalia catappa* L.
Terminalia catappa var. macrocarpa Kassk.; see *Terminalia catappa* L.
Terminalia catappa var. rhodocarpa Hassk.; see *Terminalia catappa* L.
Terminalia latifolia Blanco; see *Terminalia catappa* L.
Terminalia mauritiana (non Lamk.) Blanco; see *Terminalia catappa* L.
Terminalia moluccana Lamk.; see *Terminalia catappa* L.
Tetranthera tersa; see *Brownlowia tersa* (L.) Kosterm.
Thamnopteris nidus Presl.; see *Asplenium nidus* Linn.
Thamnopteris pachyphylla; see *Asplenium nidus* Linn.
Thelypteris palustris (A.Gray) Schott.; see *Stenochlaena palustris* (Burm. f.) Bedd.
Thespesia banalo Blanco; see *Thespesia populnea* (L.) Soland. ex Correa
Thespesia howii Hu; see *Thespesia populnea* (L.) Soland. ex Correa
Thespesia macrophylla Blume; see *Thespesia populnea* (L.) Soland. ex Correa
***Thespesia populnea* (L.) Soland. ex Correa – 204**
Thespesia populneoides Roxb.; see *Thespesia populnea* (L.) Soland. ex Correa
Thicuania moschata (Sw.) Raf.; see *Dendrobium moschatum* (Buch.-Ham.) Sw.
Tieghemopanax macgillivrayi Viguier; see *Polyscias macgillivrayi* (Seem.) Harms.
Tinus squamulosa (C.Presl.) Kuntze; see *Ardisia elliptica* Thunberg
Tittius litorea; see *Guettarda speciosa* Linn.
Tonsella prinoides Willd.; see *Salacia chinensis* L.
Tonsella chinensis (L.) Spreng.; see *Salacia chinensis* L.
Trachelospermum bowringii (Hance) Hemsl.; see *Gymnanthera oblonga* (Burm. *f*) P.S. Green
Treubia combretocarpa Pierre *ex* Boerl.; see *Lophopyxis maingayi* Hook.f.
Trianthema flexuosum Schumach. & Thon.; see *Trianthema portulacastrum* L.
Trianthema littoralis Cordem.; see *Trianthema portulacastrum* L.
Trianthema monanthogyna L.; see *Trianthema portulacastrum* L.
Trianthema monogyna L.; see *Trianthema portulacastrum* L.
Trianthema obcordata Roxb.; see *Trianthema portulacastrum* L.
Trianthema polyandrum Bl.; see *Sesuvium portulacastrum* (L.) L.
***Trianthema portulacastrum* L. – 56**
Trianthema procumbens Mill.; see *Trianthema portulacastrum* L.
Tripsilina foetida (L.) Raf.; see *Passiflora foetida* L.
***Tristellateia australasiae* A. Rich. – 127**
Tristellatia australasica Miq.; see *Tristellateia australasiae* A. Rich.
Tristellatia australis Jussieu; see *Tristellateia australasiae* A. Rich.
Tristellatia malintana Blanco; see *Tristellateia australasiae* A. Rich.

Tristerix viridiflorus Mart.; see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Tuba baccifera Rumph.; see *Anamirta cocculus* L. Wight & Arn.
Typha angustata; see *Typha angustifolia* Linné
***Typha angustifolia* Linné – 51**
Typha angustifolia ssp. *javanica*; see *Typha angustifolia* Linné
Typha capensis (*non* Rohrb.) Hall.; see *Typha angustifolia* Linné
Typha domingensis Pers.; see *Typha angustifolia* Linné
Typha domingensis var. javanica Geze; see *Typha angustifolia* Linné
Typha javanica Schnizl.; see *Typha angustifolia* Linné
Typha orientalis Briggs & Johnson; see *Typha angustifolia* Linné
Umbraculum corniculatum (L.) Kuntze.; see *Aegiceras corniculatum* (L.) Blanco
Urandra ammui Kaneh.; see *Stemonurus ammui* (Kaneh.) Sleum.
Urandra elliptica Schellenb.; see *Stemonurus ammui* (Kaneh.) Sleum.
Urostachys carinatus (Desv.) Herter ex Nesse.; see *Lycopodium carinatum* Desv.
Urostigma microcarpum (L.*f.*) Miq.; see *Ficus microcarpa* L.f.
Urostigma obtusifolia (Roxb.) Miq.; see *Ficus curtipes* Corner
Varronia sinensis Loureiro ; see *Cordia dichotoma* G. Forst.
Verbena jamaicensis L.; see *Stachytarpheta jamaicensis* (L.) Vahl
Verbesina biflora Linné; see *Wedelia biflora* (L.) DC.
Vidara littorea Rump.; see *Ximenia americana* L.
Vincetoxium carnosum (R. Br.) Benth.; see *Oxystelma carnosum* R. Br.
Viscum heyneanum DC.; see *Viscum ovalifolium* DC.
Viscum monoicum Presl.; see *Viscum ovalifolium* DC.
Viscum navicellatum Kirth.; see *Viscum ovalifolium* DC.
Viscum obtusum DC.; see *Viscum ovalifolium* DC.
Viscum orientale auct. non Willd.; see *Viscum ovalifolium* DC.
***Viscum ovalifolium* DC. – 88**
Viscum pamattonis Korth.; see *Viscum ovalifolium* DC.
Viscum pedunculatum Barlow; see *Viscum ovalifolium* DC.
Viscum roxburghianaum Korth.; see *Viscum ovalifolium* DC.
***Vitex ovata* Thunb. – 268**
Vitex rotundifolia L. *f.*; see *Vitex ovata* Thunb.
Vitex trifoliata var. ovata (Thunb.) Makino; see *Vitex ovata* Thunb.
Vitex trifolia var. simplicifolia Chamisso; see *Vitex ovata* Thunb.
Vitex trifolia var. unifoliolata Schauer.; see *Vitex ovata* Thunb.
Viscum verticillatum Roxb.; see *Viscum ovalifolium* DC.
Vitmannia elliptica Vahl.; see *Quassia indica* (Gaertn.) Nooteboom
***Vittaria elongata* Sw. – 24**
Vittaria loricea Fée; see *Vittaria elongata* Sw.
Vittaria planipes Kunze; see *Vittaria elongata* Sw.
Vittmannia polyandra; see *Brownlowia tersa* (L.) Kosterm.
Volkameria buxifolia Willd.; see *Clerodendrum inerme* (L.) Gaertn.
Volkameria inermis L.; see *Clerodendrum inerme* (L.) Gaertn.
Volkameria neriifolia Roxb.; see *Clerodendrum inerme* (L.) Gaertn.
Volutella aphylla Forssk.; see *Cassytha filiformis* Linn.
***Wedelia biflora* (L.) DC. – 108**
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Ximenia aculeata Crantz ; see *Ximenia americana* L.
***Ximenia americana* L. – 224**
Ximenia americana fo. *inermis* (Aubl.) Engl.; see *Ximenia americana* L.
Ximenia americana var. *ovata* DC.; see *Ximenia americana* L.
Ximenia arborescens Tussac ex Walp.; see *Ximenia americana* L.
Ximenia fluminensis M.Roem.; see *Ximenia americana* L.
Ximenia inermis L.; see *Ximenia americana* L.
Ximenia loranthifolia Span.; see *Ximenia americana* L.
Ximenia montana Macfad. ; see *Ximenia americana* L.
Ximenia multiflora Jacq. ; see *Ximenia americana* L.
Ximenia oblonga Lam. ex Hemsl. ; see *Ximenia americana* L.
Ximenia olacoides Wight & Arn.; see *Olax imbricata* Roxb.
Ximenia spinosa Salisb. ; see *Ximenia americana* L.
Ximenia verrucosa M. Roem. ; see *Ximenia americana* L.
Xylocarpus australiasicus Ridley; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Xylocarpus bednadirensis Mattei; see *Xylocarpus granatum* Koen.
Xylocarpus carnulosus Zoll. & Mor.; see *Xylocarpus granatum* Koen.
Xylocarpus forstenii Miq.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Xylocarpus gangeticus (Prain.) C.E. Parkinson; see *Xylocarpus moluccensis* (Lamk) M. Roem.
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Xylocarpus mekongensis Pierre; see *Xylocarpus moluccensis* (Lamk) M. Roem.
Xylocarpus minor Ridley; see *Xylocarpus granatum* Koen.
***Xylocarpus moluccensis* (Lamk) M. Roem. – 210**
Xylocarpus moluccensis auct. non M. Roem.; see *Xylocarpus granatum* Koen.
Xylocarpus moluccensis auct. non M. Roem.; see *Xylocarpus rumphii* (Kostel.) Mabb.
Xylocarpus obovatus (Blume) A. Juss.; see *Xylocarpus granatum* Koen.
Xylocarpus parvifolius Ridley; see *Xylocarpus moluccensis* (Lamk) M. Roem.
***Xylocarpus rumphii* (Kostel.) Mabb. – 211**
Zamia corsoniana G. Don.; see *Cycas rumphii* Miq.
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ANNEX 4 Index of local plant names

Bruneian:

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Bagu, see *Tristellateia australasiae* A. Rich.
Bejau, see *Tristellateia australasiae* A. Rich.
Patakoana, see *Croton heterocarpus* Müll. Arg.
Pulut-pulut, see *Kandelia candel* (L.) Druce
Pungsu, see *Cassine viburnifolia* (Juss.) Ding Hou
Rambai, see *Derris scandens* (Aubl.) Pittier
Sugang, see *Gardenia tubifera* Wall
Sulang-sulang, see *Gardenia tubifera* Wall
Wariemierie, see *Croton heterocarpus* Müll. Arg.

Cambodian:

Ampea, see *Sonneratia griffithii* Kurz.
Ampea, see *Sonneratia ovata* Back.
Ampou-krohom, see *Sonneratia caseolaris* (L.) Engl.
Ampouthmar, see *Sonneratia alba* J.E. Smith
Basac kroahom, see *Bruguiera gymnorrhiza* (L.) Lamk.
Basac, see *Bruguiera cylindrica* (L.) Bl.
Basacsor, see *Bruguiera sexangula* (Lour.) Poir.
Brong, *Acrostichum aureum* Linné
Brong, see *Acrostichum speciosum* Willd.
Chark, see *Nypa fruticans* Wurmb.
Chheu chhor, see *Excoecaria agallocha* L.
Chompouprey, see *Cerbera odollam* Gaertn.
Dawm cheungtia, see *Cerbera odollam* Gaertn.
Dawm trojiekbres, see *Barringtonia racemosa* (L.) Spreng.
Dawm-beus, see *Hibiscus tiliaceus* L.
Dawm-klai, see *Heritiera littoralis* Dryand.
Dyerehatt, see *Cordia cochinchinensis* Gagnep.
Kab-baspreyteukbray, see *Hibiscus tiliaceus* L.
Kann-kai, see *Heritiera littoralis* Dryand.
Kbagn, see *Avicennia marina* (Forssk.) Vierh.
Kbagnkmao, see *Avicennia officinalis* L.
Kbagnsor, see *Avicennia alba* Blume
Khnag n, see *Acrostichum speciosum* Willd.
Kongkang-slektoch, see *Rhizophora apiculata* Bl.
Krognungteukbray, see *Intsia bijuga* (Colebr.) Kuntze
Krognyep krohom, see *Lumnitzera littorea* (Jack) Voigt.
Krognyep sor, see *Lumnitzera racemosa* Willd.
Krognyep-pka-krohom, see *Lumnitzera littorea* (Jack) Voigt.
Krognyep-pkasor, see *Lumnitzera racemosa* Willd.
Krokos-teukpray, see *Intsia bijuga* (Colebr.) Kuntze
Mouroujsrotorb, see *Avicennia alba* Blume
Mouroujsrotorb, see *Avicennia marina* (Forssk.) Vierh.
Omlann, see *Bruguiera cylindrica* (L.) Bl.
Pchek tekbray, see *Barringtonia racemosa* (L.) Spreng.
Pdao ondawk, see *Flagellaria indica* L.
Peng, see *Phoenix paludosa* Roxb.
Pilpicht, see *Cerbera odollam* Gaertn.

Porhteukprey, see *Thespesia populnea* (L.) Soland. ex Correa
Rhumjeik-samot, see *Pandanus tectorius* Sol
Rompea-chheu, see *Sonneratia alba* J.E. Smith
Semornsakmot, see *Heritiera littoralis* Dryand.
Smairsor, see *Ceriops decandra* (Griff.) Ding Hou
Sman, see *Avicennia alba* Blume
Smerkrohorm, see *Ceriops tagal* (Perr.) C.B. Rob.
Spong, see *Avicennia officinalis* L.
Sporng, see *Avicennia marina* (Forssk.) Vierh.
Tabann, see *Xylocarpus rumphii* (Kostel.) Mabb.
Tabonkmao, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Tabonsor, see *Xylocarpus granatum* Koen.
Tatom, see *Excoecaria agallocha* L.
Trohjiekcragn pkapor sar, see *Acanthus ebracteatus* Vahl.
Trohjiekcragn pkaporsvay, see *Acanthus ilicifolius* L .
Trohjiekcragn slekbanla, see *Acanthus ilicifolius* L .
Trohjiekcragn slekweng, see *Acanthus ebracteatus* Vahl.
Vorre, see *Flagellaria indica* L.

East-Timorese:
Bakulu, see *Morinda citrifolia* L.
Kayu gelang, see *Melaleuca cajuputi* Roxb.
Olas Mea, see *Ryssopterys timoriensis* (DC.) Jussieu
Sosa, see *Cyperus javanicus* Houtt.
Taktenas, see *Typha angustifolia* Linné

Indonesian:
Abat, see *Rhizophora apiculata* Bl.
Adad, see *Symplocos celastrifolia* Griff. ex Clarke
Adu-adu, see *Lumnitzera racemosa* Willd.
Ahaha, see *Suaeda maritima* (L.) Dum.
Ai Bon, see *Bruguiera sexangula* (Lour.) Poir.
Ai elane, see *Melaleuca cajuputi* Roxb.
Ai kelane, see *Melaleuca cajuputi* Roxb.
Ai Pue, see *Excoecaria indica* (Willd.) Muell. Arg.
Ai Tohi, see *Excoecaria indica* (Willd.) Muell. Arg.
Ai Tui, see *Excoecaria indica* (Willd.) Muell. Arg.
Ai, see *Brownlowia argentata* Kurz.
Ain Hual, see *Inocarpus fagifer* (Parkinson) Fosb.
Akan pelanduk, see *Salacia chinensis* L.
Akang kangkong bulu, see *Ipomoea maxima* (L.f.) Don ex Sweet
Akar Aru, see *Combretum tetralophum* Clarke
Akar Bani, see *Dischidia rafflesiana* Wall.
Akar Banok, see *Dischidia rafflesiana* Wall.
Akar beluru, see *Entada phaseoloides* (L.) Merr.
Akar beting, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Akar Hitang, see *Ipomoea gracilis* R. Br.
Akar Kelinci, see *Caesalpinia crista* L.
Akar Kul, see *Dischidia rafflesiana* Wall.

Akar Kusu, see *Drynaria sparsisora* (Desv.) Moore
Akar nangkei, see *Combretum trifoliatum* Vent.
Akar Pakis, see *Stenochlaena palustris* (Burm. f.) Bedd.
Akar song song harus, see *Combretum trifoliatum* Vent.
Al tuban, see *Vitex ovata* Thunb.
Alakang, see *Barringtonia acutangula* (L.) Gaertn.
Alakang, see *Barringtonia racemosa* (L.) Spreng.
Alakang, see *Barringtonia racemosa* (L.) Spreng.
Alere, see *Ipomoea pes-capre* (L.) Sweet.
Alur, see *Suaeda maritima* (L.) Dum.
Ama, see *Cordia subcordata* Lam.
Ambung-ambung, see *Scaevola taccada* (Gaertn.) Roxb.
Anas, see *Scaevola taccada* (Gaertn.) Roxb.
Anggrek , see *Dendrobium subulatum* (Bl.) Lindl.
Anggrek, see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Angkaeng, see *Inocarpus fagifer* (Parkinson) Fosb.
Angkrek lilin, see *Aerides odoratum* Reinw. ex Blume
Anuanga, see *Cordia dichotoma* G. Forst.
Api, see *Scolopia macrophylla* (W. & A.) Clos
Api-api Abang, see *Avicennia marina* (Forssk.) Vierh.
Api-api Balah, see *Lumnitzera racemosa* Willd.
Api-api Daun Lebar, see *Avicennia officinalis* L.
Api-api Jambu, see *Lumnitzera racemosa* Willd.
Api-api Ludat, see *Avicennia officinalis* L.
Api-api Putih, see *Avicennia marina* (Forssk.) Vierh.
Api-api Uding, see *Lumnitzera littorea* (Jack) Voigt.
Api-api, see *Avicennia alba* Blume
Api-api, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Api-api, see *Avicennia lanata* Ridley
Aram Aron, see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Areuj, see *Caesalpinia bonduc* (L.) Roxb.
Areuj, see *Caesalpinia crista* L.
Areuy ki loma, see *Derris pinnata* (Lour.) Prain
Areuy ki menter, see *Derris pinnata* (Lour.) Prain
Areuy Ki Tonggeret, see *Derris trifoliata* Lour
Areuy munding serakit, see *Derris pinnata* (Lour.) Prain
Arnana, see *Planchonella obovata* (R.Br.) Pierre.
Aru, see *Casuarina equisetifolia* L.
Aruk, see *Caesalpinia bonduc* (L.) Roxb.
Aruk, see *Caesalpinia crista* L.
Asa-Asa, see *Allophylus cobbe* (L.) Raeusch.
Asawali, see *Pongamia pinnata* (L.) Pierre
Asinan, see *Paspalum vaginatum* Sw.
Asiwung raja matri, see *Typha angustifolia* Linné
Atung Laut, see *Heritiera littoralis* Dryand.
Awakal, see *Pongamia pinnata* (L.) Pierre
Baba koan Lelaki, see *Scaevola taccada* (Gaertn.) Roxb.
Babakoan, see *Scaevola taccada* (Gaertn.) Roxb.
Babawangan, see *Eleocharis dulcis* (Burm. f.) Henschel

Badak, see *Cerbera odollam* Gaertn.
Bagoré, see *Caesalpinia bonduc* (L.) Roxb.
Bagoré, see *Caesalpinia crista* L.
Bahu, see *Hibiscus tiliaceus* L.
Baibui, see *Intsia bijuga* (Colebr.) Kuntze
Ba'ileu, see *Fimbristylis ferruginea* (L.) Vahl
Bajang, see *Intsia bijuga* (Colebr.) Kuntze
Bajongbong, see *Phragmites karka* (Retz.) Trin. ex Steud.
Bakau Hitam, see *Rhizophora mucronata* Lamk.
Bakau Hitam, see *Rhizophora stylosa* Griff.
Bakau Korap, see *Rhizophora mucronata* Lamk.
Bakau Korap, see *Rhizophora stylosa* Griff.
Bakau Merah, see *Rhizophora mucronata* Lamk.
Bakau Merah, see *Rhizophora stylosa* Griff.
Bakau Tampusing, see *Bruguiera sexangula* (Lour.) Poir.
Bakau, see *Bruguiera exaristata* Ding Hou
Bakong, see *Crinum asiaticum* L.
Bakung, see *Crinum asiaticum* L.
Balam Timah, see *Planchonella obovata* (R.Br.) Pierre.
Balang, see *Heritiera littoralis* Dryand.
Balim-balim, see *Ipomoea pes-capre* (L.) Sweet.
Bampesu, see *Stenochlaena palustris* (Burm. f.) Bedd.
Bangka Itam, see *Rhizophora mucronata* Lamk.
Bangka Itam, see *Rhizophora stylosa* Griff.
Bangka Minyak, see *Rhizophora apiculata* Bl.
Bangkita, see *Rhizophora apiculata* Bl.
Bangkong, see *Pongamia pinnata* (L.) Pierre
Bara laut, see *Cordia subcordata* Lam.
Barak Laut, see *Cassine viburnifolia* (Juss.) Ding Hou
Barang-barang, see *Drynaria sparsisora* (Desv.) Moore
Barat Barat, see *Cassine viburnifolia* (Juss.) Ding Hou
Baru galang, see *Melaleuca cajuputi* Roxb.
Baru laut, see *Thespesia populnea* (L.) Soland. ex Correa
Baru, see *Hibiscus tiliaceus* L.
Batai Laut, see *Peltophorum pterocarpum* (DC.) K. Heyne
Batai, see *Peltophorum pterocarpum* (DC.) K. Heyne
Batang Lampung, see *Scaevola taccada* (Gaertn.) Roxb.
Batin-batin, see *Blumeodendron tokbrai* (Bl.) Kurz.
Bawang Hutan, see *Crinum asiaticum* L.
Bawuntulon, see *Scaevola taccada* (Gaertn.) Roxb.
Bebawangan, see *Scirpus grossus* Linné
Bebira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Bekil, see *Lasia spinosa* (L.) Thwaites
Belangan, see *Scolopia macrophylla* (W. & A.) Clos
Belibu, see *Atuna racemosa ssp. racemosa* Rafin.
Belohila, see *Heritiera littoralis* Dryand.
Belukap, see *Rhizophora mucronata* Lamk.
Belukap, see *Rhizophora stylosa* Griff.
Beluntas, see *Pluchea indica* (L.) Less

Bendan, see *Derris scandens* (Aubl.) Pittier
Bendoh, see *Entada phaseoloides* (L.) Merr.
Bengkak, see *Hernandia ovigera* L.
Bengkudu, see *Morinda citrifolia* L.
Beowa, see *Terminalia catappa* L.
Beruwas Laut, see *Scaevola taccada* (Gaertn.) Roxb.
Beureum, see *Eleocharis dulcis* (Burm. f.) Henschel
Beus, see *Kandelia candel* (L.) Druce
Bhalang tambal, see *Entada phaseoloides* (L.) Merr.
Bhalang, see *Entada phaseoloides* (L.) Merr.
Bhunjok, see *Nypa fruticans* Wurmb.
Bidada, see *Sonneratia alba* J.E. Smith
Bidada, see *Sonneratia caseolaris* (L.) Engl.
Bidara laut, see *Ximenia americana* L.
Bidara, see *Ximenia americana* L.
Bidaro, see *Ximenia americana* L.
Bido-bido, see *Ceriops decandra* (Griff.) Ding Hou
Bido-bido, see *Ceriops tagal* (Perr.) C.B. Rob.
Biet, see *Phragmites karka* (Retz.) Trin. ex Steud.
Bilu Tasi, see *Cerbera manghas* L.
Bilu Tasi, see *Cerbera odollam* Gaertn.
Binasi, see *Planchonella obovata* (R.Br.) Pierre.
Bingalo, see *Viscum ovalifolium* DC.
Binong laut, see *Hernandia ovigera* L.
Bintan, see *Cerbera manghas* L.
Bintan, see *Cerbera odollam* Gaertn.
Bintana, see *Kleinhovia hospita* L..
Bintangur, see *Kleinhovia hospita* L..
Bintangur Pantai, see *Symplocos celastrifolia* Griff. ex Clarke
Bintaro, see *Cerbera manghas* L.
Bintaro, see *Cerbera odollam* Gaertn.
Bintit, see *Mischocarpus sundaicus* Blume
Bira bira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Biring jene, see *Clerodendrum inerme* (L.) Gaertn.
Biron, see *Stachytarpheta jamaicensis* (L.) Vahl
Bitung, see *Barringtonia asiatica* (L.) Kurz
Blakangabu, see *Heritiera littoralis* Dryand.
Boak, see *Avicennia alba* Blume
Bogem, see *Sonneratia alba* J.E. Smith
Bogem, see *Sonneratia caseolaris* (L.) Engl.
Bogem, see *Sonneratia ovata* Back.
Bojo, see *Scaevola taccada* (Gaertn.) Roxb.
Bojolo, see *Scaevola taccada* (Gaertn.) Roxb.
Bolowereke, see *Entada phaseoloides* (L.) Merr.
Bonduc, see *Caesalpinia crista* L.
Boppa Ceda, see *Scaevola taccada* (Gaertn.) Roxb.
Boroslanang, see *Eleocharis spiralis* (Rottb.) R. & S.
Buah letus, see *Ardisia elliptica* Thunberg
Buah Pitri, see *Passiflora foetida* L.

Buah tikus, see *Passiflora foetida* L.
Bubira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Bukolako, see *Scaevola taccada* (Gaertn.) Roxb.
Bulangan, see *Azima sarmentosa* (Bl.) B. & H.
Bundung, see *Scirpus grossus* Linné
Bunga Batang, see *Wedelia biflora* (L.) DC.
Bungan pulir, see *Passiflora foetida* L.
Bungkangan, see *Mischocarpus sundaicus* Blume
Burus, see *Bruguiera cylindrica* (L.) Bl.
Bus, see *Melaleuca cajuputi* Roxb.
Busing, see *Bruguiera sexangula* (Lour.) Poir.
Busung, see *Bruguiera sexangula* (Lour.) Poir.
Buta badak, see *Cerbera manghas* L.
Buta-buta Madang, see *Cerbera manghas* L.
Buta-buta Madang, see *Cerbera odollam* Gaertn.
Buta-buta, see *Excoecaria agallocha* L.
Butun Darat, see *Barringtonia racemosa* (L.) Spreng.
Butun, see *Barringtonia asiatica* (L.) Kurz
Buwa Goro, see *Caesalpinia bonduc* (L.) Roxb.
Buwa Goro, see *Caesalpinia crista* L.
Buyuk, see *Nypa fruticans* Wurmb.
Calpong, see *Calophyllum inophyllum* L.
Cangkudu, see *Morinda citrifolia* L.
Cantigi, see *Pemphis acidula* J.R. & G. Forst.
Cantinggi, see *Pemphis acidula* J.R. & G. Forst.
Cariju, see *Entada phaseoloides* (L.) Merr.
Cemara laut, see *Casuarina equisetifolia* L.
Cempaga, see *Tristellateia australasiae* A. Rich.
Cempaka hutan, see *Gardenia tubifera* Wall
Cena, see *Cordia dichotoma* G. Forst.
Cerlang Laut, see *Heritiera littoralis* Dryand.
Cikai, see *Eleocharis dulcis* (Burm. f.) Henschel
Cilekle, see *Scaevola taccada* (Gaertn.) Roxb.
Cingam, see *Scyphiphora hydrophyllacea* Gaertn. f.
Cukilan, see *Allophylus cobbe* (L.) Raeusch.
Culiket, see *Diospyros malabarica* (Descr.) Kostel.
Dadap, see *Erythrina orientalis* (L.) Murr.
Dalere, see *Ipomoea pes-capre* (L.) Sweet.
Dandulit, see *Scyphiphora hydrophyllacea* Gaertn. f.
Dangsa, see *Phoenix paludosa* Roxb.
Darendeng, see *Cyperus malaccensis* Lamk.
Daruyu, see *Acanthus ilicifolius* L .
Dau, see *Bruguiera gymnorrhiza* (L.) Lamk.
Daun kambing, see *Premna obtusifolia* R. Br.
Daun korpa , see *Dischidia benghalensis* Colebr.
Daun pitis kecil, see *Dischidia benghalensis* Colebr.
Daun Pitis Kecil, see *Dischidia nummularia* R.Br.
Daun puyu, see *Salacia chinensis* L.
Daun saga, see *Abrus precatorius* L.

Da-usa, see *Crinum asiaticum* L.
Dekeng, see *Eleocharis dulcis* (Burm. f.) Henschel
Dekeng, see *Cyperus javanicus* Houtt.
Delima hutan, see *Gardenia tubifera* Wall
Dempul Lelet Gajah, see *Glochidion littorale* Bl.
Dempul, see *Glochidion littorale* Bl.
Dingkaran, see *Calophyllum inophyllum* L.
Donggo Akit, see *Rhizophora apiculata* Bl.
Dongoh Korap, see *Rhizophora mucronata* Lamk.
Dongoh Korap, see *Rhizophora stylosa* Griff.
Duduk Agung, see *Aegiceras corniculatum* (L.) Blanco
Duduk Agung, see *Lumnitzera littorea* (Jack) Voigt.
Duduk Gedeh, see *Lumnitzera littorea* (Jack) Voigt.
Duduk Laki-laki, see *Lumnitzera racemosa* Willd.
Duduk Perempuan, see *Scyphiphora hydrophyllacea* Gaertn. f.
Duduk, see *Lumnitzera racemosa* Willd.
Dudul Rayap, see *Scyphiphora hydrophyllacea* Gaertn. f.
Dudulan, see *Scaevola taccada* (Gaertn.) Roxb.
Dulang jai, see *Ricinus communis* L.
Dulok-dulok, see *Osbornia octodonta* F.v.Muell.
Dumpajang, see *Terminalia catappa* L.
Dungu, see *Heritiera littoralis* Dryand.
Dungun air, see *Brownlowia tersa* (L.) Kosterm.
Dungun laut, see *Heritiera littoralis* Dryand.
Dungun, see *Heritiera littoralis* Dryand.
Dunuko, see *Vitex ovata* Thunb.
Embet, see *Typha angustifolia* Linné
Endong, see *Eleocharis spiralis* (Rottb.) R. & S.
Endong, see *Scirpus litoralis* Schrad.
Fala, see *Cordia subcordata* Lam.
Fana, see *Cordia subcordata* Lam.
Fanasa, see *Ardisia elliptica* Thunberg
Fau, see *Hibiscus tiliaceus* L.
Fete-fete, see *Crinum asiaticum* L.
Fikus, see *Ficus microcarpa* L.f.
Fojet, see *Dolichandrone spathacea* (l.f.) K.Schum.
Gabus Cina, see *Scaevola taccada* (Gaertn.) Roxb.
Gabus, see *Scaevola taccada* (Gaertn.) Roxb.
Gabusan, see *Scaevola taccada* (Gaertn.) Roxb.
Gadel, see *Derris trifoliata* Lour
Gagabusan, see *Scaevola taccada* (Gaertn.) Roxb.
Gajam, see *Inocarpus fagifer* (Parkinson) Fosb.
Gajang, see *Inocarpus fagifer* (Parkinson) Fosb.
Gajonggong, see *Phragmites karka* (Retz.) Trin. ex Steud.
Galala, see *Erythrina orientalis* (L.) Murr.
Gali-gali, see *Lasia spinosa* (L.) Thwaites.
Galumi, see *Vitex ovata* Thunb.
Gambir ayer, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Gambir laut, see *Clerodendrum inerme* (L.) Gaertn.

Gandu, see *Entada phaseoloides* (L.) Merr.
Ganggeng, see *Najas indica* (Willd.) Cham.
Gasep, see *Inocarpus fagifer* (Parkinson) Fosb.
Gatep Pahit, see *Quassia indica* (Gaertn.) Nooteboom
Gayamu, see *Inocarpus fagifer* (Parkinson) Fosb.
Gegambo, see *Passiflora foetida* L.
Geida, see *Cyperus malaccensis* Lamk.
Gelala, see *Erythrina orientalis* (L.) Murr.
Gelam, see *Melaleuca cajuputi* Roxb.
Geriting, see *Lumnitzera littorea* (Jack) Voigt.
Gigi Gajah, see *Aegiceras corniculatum* (L.) Blanco
Gigirintingan, see *Cynodon dactylon* (L.) Pers.
Gilitopa, see *Scaevola taccada* (Gaertn.) Roxb.
Glagah Asu, see *Phragmites karka* (Retz.) Trin. ex Steud.
Gli-gli, see *Lasia spinosa* (L.) Thwaites
Gloah, see *Ricinus communis* L.
Goboel, see *Derris scandens* (Aubl.) Pittier
Gogopoa, see *Cycas rumphii* Miq.
Goleng, see *Mischocarpus sundaicus* Blume
Goro-goro Raci, see *Excoecaria agallocha* L.
Goro-goro, see *Cerbera manghas* L.
Goro-goro, see *Cerbera odollam* Gaertn.
Grintingan, see *Cynodon dactylon* (L.) Pers.
Gumi Guraci, see *Cassytha filiformis* Linn.
Gumulong, see *Phragmites karka* (Retz.) Trin. ex Steud.
Haha, see *Batis argillicola* van Royen
Hapo-hapo, see *Hernandia ovigera* L.
Harendong, see *Melastoma malabathricum* var. *malabathricum* L.
Haruna, see *Guettarda speciosa* Linn.
Hata Diuk, see *Acrostichum aureum* Linné
Hau Kolo, see *Peltophorum pterocarpum* (DC.) K. Heyne
Heikre, see *Typha angustifolia* Linné
Hirang Krama, see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Hokal, see *Scaevola taccada* (Gaertn.) Roxb.
Hutu, see *Barringtonia asiatica* (L.) Kurz
Inggolom, see *Melaleuca cajuputi* Roxb.
Ipi, see *Intsia bijuga* (Colebr.) Kuntze
Ipil, see *Intsia bijuga* (Colebr.) Kuntze
Ipilo, see *Intsia bijuga* (Colebr.) Kuntze
Ipus in cawok, see *Entada phaseoloides* (L.) Merr.
Irono Ngelak, see *Melaleuca cajuputi* Roxb.
Iwal, see *Hibiscus tiliaceus* L.
Jabai, see *Ficus microcarpa* L.f.
Jabal, see *Cerbera manghas* L.
Jabal, see *Cerbera odollam* Gaertn.
Jaga, see *Barringtonia asiatica* (L.) Kurz
Jampak luyak, see *Derris pinnata* (Lour.) Prain
Jankar, see *Rhizophora apiculata* Bl.
Jankar, see *Rhizophora mucronata* Lamk.

Jankar, see *Rhizophora stylosa* Griff.
Jarak kosta, see *Ricinus communis* L.
Jarak, see *Ricinus communis* L.
Jaran Pelok, see *Dolichandrone spathacea* (l.f.) K.Schum.
Jaranan, see *Dolichandrone spathacea* (l.f.) K.Schum.
Jarang, see *Dolichandrone spathacea* (l.f.) K.Schum.
Jarang, see *Ricinus communis* L.
Jarong, see *Stachytarpheta jamaicensis* (L.) Vahl
Jarongan lalaki, see *Stachytarpheta jamaicensis* (L.) Vahl
Jarongan, see *Stachytarpheta jamaicensis* (L.) Vahl
Jati Pasir, see *Guettarda speciosa* Linn.
Jejawi, see *Ficus microcarpa* L.f.
Jekeng, see *Cyperus compactus* Retz.
Jekeng, see *Cyperus javanicus* Houtt.
Jengkok, see *Planchonella obovata* (R.Br.) Pierre.
Jeraman, see *Glochidion littorale* Bl.
Jeruju, see *Acanthus ebracteatus* Vahl.
Jeruju, see *Acanthus ilicifolius* L .
Jerukan, see *Acronychia pedunculata* (L.) Miq.
Jingalo, see *Viscum ovalifolium* DC.
Joa-joa dowongi, see *Canavalia maritima* Thouars
Jomba, see *Xylocarpus granatum* Koen.
Kaap, see *Passiflora foetida* L.
Kabai-kabai, see *Ipomoea pes-capre* (L.)
Kabaru, see *Hibiscus tiliaceus* L.
Kacang kayu laut, see *Pongamia pinnata* (L.) Pierre
Kacang Laut, see *Canavalia maritima* Thouars
Kaceprok, see *Passiflora foetida* L.
Kadong, see *Cerbera manghas* L.
Kadong, see *Cerbera odollam* Gaertn.
Kailau, see *Rhizophora apiculata* Bl.
Kajang-kajang, see *Crinum asiaticum* L.
Kajeng Kapal, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kaju Ambong, see *Scaevola taccada* (Gaertn.) Roxb.
Kaju Pelok, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kaju Pelumping, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kala Keok, see *Acrostichum aureum* Linné
Kalak Kambing, see *Finlaysonia obovata* Wall.
Kalapa tiyung, see *Horsfieldia irya* (Gaertn.) Warb.
Kalapinrang, see *Excoecaria agallocha* L.
Kalembemba, see *Entada phaseoloides* (L.) Merr.
Kalikih alang, see *Ricinus communis* L.
Kalumagus, see *Rhizophora apiculata* Bl.
Kambing-kambing, see *Sarcolobus globosus* Wall.
Kampis, see *Hernandia ovigera* L.
Kamulut, see *Derris trifoliata* Lour
Kandeka, see *Bruguiera gymnorrhiza* (L.) Lamk.
Kangkong Laut, see *Ipomoea gracilis* R. Br.
Kaniker, see *Caesalpinia bonduc* (L.) Roxb.

Kaniker, see *Caesalpinia crista* L.
Kanonang, see *Cordia dichotoma* G. Forst.
Kapal, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kapo-kapo, see *Glochidion littorale* Bl.
Karamunting, see *Ochthocharis bornensis* Bl.
Kasjanaf, see *Hibiscus tiliaceus* L.
Kasongket, see *Phragmites karka* (Retz.) Trin. ex Steud.
Katang-katang, see *Ipomoea pes-capre* (L.) Sweet.
Katé-katé, see *Caesalpinia bonduc* (L.) Roxb.
Katé-katé, see *Caesalpinia crista* L.
Kateng, see *Cynometra iripa* Kostel.
Kateng, see *Cynometra ramiflora* L.
Kati-kati, see *Dolichandrone spathacea* (l.f.) K.Schum.
Katimaga, see *Kleinhovia hospita* L..
Katimaha, see *Kleinhovia hospita* L..
Katimahar, see *Kleinhovia hospita* L..
Kaya Kil, see *Olax imbricata* Roxb.
Kayu Besi Ambon, see *Intsia bijuga* (Colebr.) Kuntze
Kayu Bulan, see *Fagraea crenulata* Maingay ex C.B. Clarke
Kayu buta, see *Excoecaria agallocha* L.
Kayu buta, see *Excoecaria agallocha* L.
Kayu Jaran Binek, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kayu Jaran, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kayu Jiharan, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kayu Juwok, see *Peltophorum pterocarpum* (DC.) K. Heyne
Kayu keramat, see *Podocarpus polystachyus* R.Br. ex Endl.
Kayu Kuda, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kayu Kurita, see *Cerbera manghas* L.
Kayu Kurita, see *Cerbera odollam* Gaertn.
Kayu lampiko, see *Ardisia elliptica* Thunberg
Kayu Pahit, see *Quassia indica* (Gaertn.) Nooteboom
Kayu pel, see *Cynometra iripa* Kostel
Kayu Pel, see *Cynometra ramiflora* L.
Kayu puti, see *Melaleuca cajuputi* Roxb.
Kayu Semidra, see *Acronychia pedunculata* (L.) Miq.
Kayu Semilit, see *Pachycentria constricta* (Bl.) Blume
Kayu sentigi, see *Pemphis acidula* J.R. & G. Forst.
Kayu Sila, see *Aegiceras corniculatum* (L.) Blanco
Kayu Susu, see *Cerbera manghas* L.
Kayu Susu, see *Cerbera odollam* Gaertn.
Kayu Tahun, see *Kleinhovia hospita* L..
Kayu Tanyong, see *Symplocos celastrifolia* Griff. ex Clarke
Kayu tulak, see *Gardenia tubifera* Wall
Kayu urum, see *Mischocarpus sundaicus* Blume
Kayu Wuta, see *Excoecaria agallocha* L.
Keben-keben, see *Barringtonia asiatica* (L.) Kurz
Kecipir, see *Blumeodendron tokbrai* (Bl.) Kurz.
Kedabu, see *Sonneratia ovata* Back.
Kedot, see *Cyperus malaccensis* Lamk.

Kekara Laut, see *Canavalia maritima* Thouars
Kekara pedang, see *Canavalia maritima* Thouars
Keladi Payau, see *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott
Keladi, see *Colocasia esculenta* (L.) Schott
Kelaju, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kelepis, see *Quassia indica* (Gaertn.) Nooteboom
Kemadean, see *Dendrophthoe pentandra* (L.) Miq.
Kemaduhan, see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Kemalahala, see *Salicornia indica* Willd.
Kemanden, see *Melastoma malabathricum* var. *malabathricum* L.
Kembang bugang, see *Clerodendrum inerme* (L.) Gaertn.
Kemlandean, see *Dendrophthoe pentandra* (L.) Miq.
Kemrounggi, see *Caesalpinia bonduc* (L.) Roxb.
Kemrounggi, see *Caesalpinia crista* L.
Kena, see *Cordia subcordata* Lam.
Kendal, see *Cordia dichotoma* G. Forst.
Kendung, see *Symplocos celastrifolia* Griff. ex Clarke
Keneas, see *Pemphis acidula* J.R. & G. Forst.
Keneras, see *Allophylus cobbe* (L.) Raeusch.
Kenyang-kenyang, see *Guettarda speciosa* Linn.
Kenyen Putih, see *Cerbera odollam* Gaertn.
Kenyeri Putih, see *Cerbera odollam* Gaertn.
Kepala Berok, see *Hydnophytum formicarum* Jack
Kepel, see *Cynometra iripa* Kostel.
Kepel, see *Cynometra ramiflora* L.
Keptun, see *Barringtonia asiatica* (L.) Kurz
Ketapang, see *Terminalia catappa* L.
Ketapas, see *Terminalia catappa* L.
Keterung, see *Blumeodendron tokbrai* (Bl.) Kurz.
Ketowang, see *Ricinus communis* L.
Ketumbang, see *Glochidion littorale* Bl.
Ketuwer, see *Clerodendrum inerme* (L.) Gaertn.
Ki Arak, see *Dolichandrone spathacea* (l.f.) K.Schum.
Ki howe, see *Mischocarpus sundaicus* Blume
Ki Jaran, see *Dolichandrone spathacea* (l.f.) K.Schum.
Ki Pahang Laut, see *Pongamia pinnata* (L.) Pierre
Ki putri, see *Podocarpus polystachyus* R.Br. ex Endl.
Ki salira, see *Acronychia pedunculata* (L.) Miq.
Kiei, see *Brownlowia argentata* Kurz.
Kikisa, see *Cyperus javanicus* Houtt.
Kilaula, see *Terminalia catappa* L.
Kisokka, see *Atuna racemosa* ssp. *racemosa* Rafin.
Kiu Tasi, see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Kleca, see *Diospyros malabarica* (Descr.) Kostel.
Klega, see *Diospyros malabarica* (Descr.) Kostel.
Klengkeng, see *Caesalpinia bonduc* (L.) Roxb.
Klengkeng, see *Caesalpinia crista* L.
Klihi, see *Terminalia catappa* L.
Klimasada, see *Cordia subcordata* Lam.

Klindo, see *Scaevola taccada* (Gaertn.) Roxb.
Klis, see *Terminalia catappa* L.
Kluruk, see *Melastoma malabathricum* var. *malabathricum* L.
Knadate, see *Cordia dichotoma* G. Forst.
Knias, see *Lumnitzera racemosa* Willd.
Koak, see *Avicennia alba* Blume
Kodokan, see *Fimbristylis cymosa* R. Br.
Kodokan, see *Fimbristylis ferruginea* (L.) Vahl
Koi a koi, see *Clerodendrum inerme* (L.) Gaertn.
Kokole, see *Scaevola taccada* (Gaertn.) Roxb.
Kokrok, see *Flagellaria indica* L.
Korma Rawa, see *Phoenix paludosa* Roxb.
Koyandan, see *Cerbera odollam* Gaertn.
Krajep, see *Trianthema portulacastrum* L.
Krakas, see *Acrostichum aureum* Linné
Kranji, see *Pongamia pinnata* (L.) Pierre
Krokot, see *Sesuvium portulacastrum* (L.) L.
Krokot, see *Trianthema portulacastrum* L.
Krunjing, see *Symplocos celastrifolia* Griff. ex Clarke
Kruppe, see *Anamirta cocculus* L. Wight & Arn.
Kubaing, see *Combretum trifoliatum* Vent.
Kuda-kuda, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kudo-kudo Uwi, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kulimbabok, see *Symplocos celastrifolia* Griff. ex Clarke
Kumbu, see *Cyperus malaccensis* Lamk.
Kumpai Lubang, see *Lycopodium carinatum* Desv.
Kungkungan, see *Barringtonia racemosa* (L.) Spreng.
Kutuk, see *Caesalpinia bonduc* (L.) Roxb.
Kutuk, see *Caesalpinia crista* L.
Kwakatehi, see *Ryssopterys timoriensis* (DC.) Jussieu
Lagundi, see *Vitex ovata* Thunb.
Lalang-kapan, see *Wedelia biflora* (L.) DC.
Lambaran, see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Lambideing, see *Stenochlaena palustris* (Burm. f.) Bedd.
Lampeni, see *Ardisia elliptica* Thunberg
Lamutasi, see *Pluchea indica* (L.) Less
Lana-lana, see *Ricinus communis* L.
Landing-landing, see *Cassine viburnifolia* (Juss.) Ding Hou
Langgade, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Lantolo, see *Cordia dichotoma* G. Forst.
Lau bintang, see *Aerides odoratum* Reinw. ex Blume
Lau pandan, see *Cymbidium finlaysonianum* Wall ex Lindl.
Lawanan Kete, see *Heritiera littoralis* Dryand.
Lawang, see *Heritiera littoralis* Dryand.
Lawarani, see *Vitex ovata* Thunb.
Lemanas, see *Passiflora foetida* L.
Lemiding, see *Stenochlaena palustris* (Burm. f.) Bedd.
Lempeni, see *Ardisia elliptica* Thunberg
Lempoyan Paya, see *Horsfieldia irya* (Gaertn.) Warb.

Lenabou, see *Pluchea indica* (L.) Less
Lenggadai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Lenggayong, see *Rhizophora mucronata* Lamk.
Lenggayong, see *Rhizophora stylosa* Griff.
Lenteng, see *Olax imbricata* Roxb.
Libung, see *Oncosperma tigillarium* (Jack.) Ridl.
Lilanga, see *Drynaria sparsisora* (Desv.) Moore
Lilegundi, see *Vitex ovata* Thunb.
Lindur, see *Bruguiera cylindrica* (L.) Bl.
Lindur, see *Bruguiera gymnorrhiza* (L.) Lamk.
Lindur, see *Bruguiera sexangula* (Lour.) Poir.
Lingi, see *Scirpus grossus* Linné
Lingkaren, see *Calophyllum inophyllum* L.
Lipa, see *Nypa fruticans* Wurmb.
Lisa, see *Terminalia catappa* L.
Lolaro, see *Rhizophora mucronata* Lamk.
Lolaro, see *Rhizophora stylosa* Griff.
Loleso, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Loloro, see *Ipomoea pes-capre* (L.) Sweet.
Lom, see *Cathormion umbellatum* (M.Vahl.) Kosterm.
Lomo, see *Atuna racemosa ssp. racemosa* Rafin.
Lulang, see *Ricinus communis* L.
Luluk, see *Ricinus communis* L.
Lulun, see *Heritiera littoralis* Dryand.
Lumpui, see *Flagellaria indica* L.
Lumut Siarang, see *Najas indica* (Willd.) Cham.
Lutur bal, see *Ricinus communis* L.
Luumpoyang, see *Terminalia catappa* L.
Ma Gorago, see *Lumnitzera littorea* (Jack) Voigt.
Machlana, see *Hernandia ovigera* L.
Mahandap, see *Hernandia ovigera* L.
Mahar, see *Kleinhovia hospita* L..
Makasuta, see *Excoecaria agallocha* L.
Makente, see *Entada phaseoloides* (L.) Merr.
Makusi, see *Diospyros malabarica* (Descr.) Kostel.
Malabira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Malegai, see *Barringtonia racemosa* (L.) Spreng.
Malur, see *Suaeda maritima* (L.) Dum.
Mampapu, see *Cordia dichotoma* G. Forst.
Mangandeauh, see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Mangandeuh, see *Dendrophthoe pentandra* (L.) Miq.
Mangar, see *Kleinhovia hospita* L..
Mangga Brabu, see *Cerbera manghas* L.
Mangga Brabu, see *Cerbera odollam* Gaertn.
Mangi-mangi Putih, see *Avicennia alba* Blume
Mangkinang Tikus, see *Symplocos celastrifolia* Griff. ex Clarke
Manonang, see *Cordia dichotoma* G. Forst.
Manor utan, see *Clerodendrum inerme* (L.) Gaertn.
Manuru dowongi, see *Clerodendrum inerme* (L.) Gaertn.

Mapopo, see *Hernandia ovigera* L.
Marauwen, see *Pongamia pinnata* (L.) Pierre
Marong, see *Scolopia macrophylla* (W. & A.) Clos
Mas Semasan, see *Cassytha filiformis* Linn.
Mata Buaya, see *Bruguiera sexangula* (Lour.) Poir.
Mata Huli, see *Excoecaria agallocha* L.
Mata ikan, see *Hernandia ovigera* L.
Mata Kijang, see *Caesalpinia bonduc* (L.) Roxb.
Mata Kijang, see *Caesalpinia crista* L.
Matonda, see *Asplenium nidus* Linné
Mawiao, see *Hernandia ovigera* L.
Mayu serai, see *Podocarpus polystachyus* R.Br. ex Endl.
Medang geliser, see *Gardenia tubifera* Wall
Mekudu, see *Morinda citrifolia* L.
Melabira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Melat, see *Stenochlaena palustris* (Burm. f.) Bedd.
Mempenai, see *Cassine viburnifolia* (Juss.) Ding Hou
Menengan, see *Excoecaria agallocha* L.
Mengelangan, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Mengkuang , see *Pandanus tectorius* Sol
Mengkudu, see *Morinda citrifolia* L.
Mentigi, see *Pemphis acidula* J.R. & G. Forst.
Merbau cangkat, see *Intsia bijuga* (Colebr.) Kuntze
Merbau, see *Intsia bijuga* (Colebr.) Kuntze
Meta Pelandok, see *Cassine viburnifolia* (Juss.) Ding Hou
Miding, see *Stenochlaena palustris* (Burm. f.) Bedd.
Migin, see *Brownlowia argentata* Kurz.
Miju, see *Barringtonia asiatica* (L.) Kurz
Mojong Tihulu, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Moju, see *Barringtonia asiatica* (L.) Kurz
Mokal, see *Scaevola taccada* (Gaertn.) Roxb.
Molowahu, see *Hibiscus tiliaceus* L.
Monot-bonot, see *Osbornia octodonta* F.v.Muell.
Moteti, see *Passiflora foetida* L.
Murmasada, see *Cordia subcordata* Lam.
Namu-namu utan, see *Cynometra iripa* Kostel.
Namu-namu Utan, see *Cynometra ramiflora* L.
Nawoko ma lako, see *Hernandia ovigera* L.
Ngadi renga, see *Stachytarpheta jamaicensis* (L.) Vahl
Ngoa, see *Erythrina orientalis* (L.) Murr.
Niangka, see *Scaevola taccada* (Gaertn.) Roxb.
Nibong, see *Oncosperma tigillarium* (Jack.) Ridl
Nibung, see *Oncosperma tigillarium* (Jack.) Ridl.
Nipah, see *Nypa fruticans* Wurmb.
Niri Batu, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Niri, see *Xylocarpus rumphii* (Kostel.) Mabb.
Nonang, see *Cordia dichotoma* G. Forst.
Nonwai tasi, see *Cordia subcordata* Lam.
Nopu, see *Crinum asiaticum* L.

Nunang, see *Cordia dichotoma* G. Forst.
Nyalako, see *Hernandia ovigera* L.
Nyalu, see *Hernandia ovigera* L.
Nyambing, see *Lasia spinosa* (L.) Thwaites
Nyamplung, see *Calophyllum inophyllum* L.
Nyatoh labar, see *Planchonella obovata* (R.Br.) Pierre.
Nyatoh lamber, see *Planchonella obovata* (R.Br.) Pierre.
Nyireh, see *Xylocarpus rumphii* (Kostel.) Mabb.
Nyiri Gundik, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Nyiri Hutan, see *Xylocarpus granatum* Koen.
Nyiri Udang, see *Xylocarpus granatum* Koen.
Nyuru, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Olas Mea, see *Ryssopterys timoriensis* (DC.) Jussieu
Onne, see *Quassia indica* (Gaertn.) Nooteboom
Onunang, see *Cordia dichotoma* G. Forst.
Owar, see *Flagellaria indica* L.
Oyod Kambing, see *Finlaysonia obovata* Wall.
Oyod peron, see *Anamirta cocculus* L. Wight & Arn.
Oyod sambaing, see *Derris pinnata* (Lour.) Prain
Pacean, see *Passiflora foetida* L.
Paceda, see *Scaevola taccada* (Gaertn.) Roxb.
Padang Kawat, see *Cynodon dactylon* (L.) Pers.
Padang Lepas, see *Cynodon dactylon* (L.) Pers.
Pagoro, see *Eleocharis dulcis* (Burm. f.) Henschel
Pake Saukatibu, see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Pakis Bang, see *Stenochlaena palustris* (Burm. f.) Bedd.
Pakis Dongol, see *Cycas rumphii* Miq.
Pakis Duitan, see *Drymoglossum piloselloides* (Linn.) Presl.
Pakis Gajah, see *Cycas rumphii* Miq.
Pakis Haji, see *Cycas rumphii* Miq.
Pakis Laut, see *Cycas rumphii* Miq.
Pakis Menjangan, see *Platycerium coronarium* (Koenig.) Desv.
Pakis Raja, see *Cycas rumphii* Miq.
Pakis sarang semut, see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Pakis Tanduk Rusah, see *Platycerium coronarium* (Koenig.) Desv.
Paku Cacing, see *Phymatodes scolopendria* (Burm.) Ching.
Paku haji, see *Cycas rumphii* Miq.
Paku hata, see *Acrostichum aureum* Linné
Paku Hurang, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku kawat, see *Lycopodium carinatum* Desv.
Paku Kayakas, see *Drynaria rigidula* (Sw.) Bedd.
Paku Latig Layangan, see *Drynaria sparsisora* (Desv.) Moore
Paku Laut, see *Acrostichum aureum* Linné
Paku layang layang, see *Drynaria sparsisora* (Desv.) Moore
Paku Lumut Batu, see *Davallia parvula* Wall. ex Hook. & Grev.
Paku Ramiding, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku sarang burung, see *Asplenium nidus* Linné
Paku Tjaj, see *Acrostichum aureum* Linné
Paku ton, see *Ricinus communis* L.

Paku Ular, see *Phymatodes scolopendria* (Burm.) Ching.
Palas duri, see *Licuala spinosa* Wurmb.
Palas, see *Licuala spinosa* Wurmb.
Palawan, see *Combretum trifoliatum* Vent.
Palun, see *Ceriops decandra* (Griff.) Ding Hou
Palun, see *Ceriops tagal* (Perr.) C.B. Rob.
Palungpung, see *Phragmites karka* (Retz.) Trin. ex Steud.
Pamuli, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Pancal, see *Planchonella obovata* (R.Br.) Pierre.
Pandan nipah, see *Pandanus tectorius* Sol
Pandan pudak, see *Pandanus tectorius* Sol
Pandaram Boheng, see *Inocarpus fagifer* (Parkinson) Fosb.
Pangoke, see *Eleocharis dulcis* (Burm. f.) Henschel
Panimburana, see *Scaevola taccada* (Gaertn.) Roxb.
Panimburang, see *Scaevola taccada* (Gaertn.) Roxb.
Papa Blung, see *Cycas rumphii* Miq.
Papaceda, see *Scaevola taccada* (Gaertn.) Roxb.
Papajaran, see *Azima sarmentosa* (Bl.) B. & H.
Parai, see *Rhizophora apiculata* Bl.
Parongpong, see *Phragmites karka* (Retz.) Trin. ex Steud.
Parun, see *Ceriops decandra* (Griff.) Ding Hou
Parun, see *Ceriops tagal* (Perr.) C.B. Rob.
Pasilan kelapa, see *Drynaria rigidula* (Sw.) Bedd.
Pasilan, see *Dendrophthoe pentandra* (L.) Miq.
Pasilan, see *Macrosolen cochinchinensis* (Lour.) Tiegh.
Pasisir, see *Heritiera littoralis* Dryand.
Patuku, see *Cycas rumphii* Miq.
Pea-pea, see *Cyperus malaccensis* Lamk.
Pedada, see *Sonneratia alba* J.E. Smith
Pedada, see *Sonneratia caseolaris* (L.) Engl.
Pelenda Laut, see *Scaevola taccada* (Gaertn.) Roxb.
Peler kambing sejuk, see *Sarcolobus globosus* Wall.
Peler kambing, see *Sarcolobus globosus* Wall.
Pemandum, see *Brownlowia argentata* Kurz.
Penarahan, see *Horsfieldia irya* (Gaertn.) Warb.
Penggung, see *Barringtonia racemosa* (L.) Spreng.
Penjalinan, see *Mischocarpus sundaicus* Blume
Penjalinan, see *Scirpus litoralis* Schrad
Peperetan, see *Eleocharis dulcis* (Burm. f.) Henschel
Percut kuda, see *Stachytarpheta jamaicensis* (L.) Vahl
Peredah Burung, see *Horsfieldia irya* (Gaertn.) Warb.
Perepat Lanang, see *Scyphiphora hydrophyllacea* Gaertn. f.
Perepat Tudung, see *Aegiceras corniculatum* (L.) Blanco
Perepat, see *Sonneratia alba* J.E. Smith
Perepat, see *Sonneratia caseolaris* (L.) Engl.
Permot, see *Passiflora foetida* L.
Perpat Kecil, see *Aegiceras corniculatum* (L.) Blanco
Pertut, see *Bruguiera gymnorrhiza* (L.) Lamk.
Perumpung, see *Phragmites karka* (Retz.) Trin. ex Steud.

Peru-peru, see *Eleocharis dulcis* (Burm. f.) Henschel
Piai Lasa, see *Acrostichum speciosum* Willd.
Pidada, see *Sonneratia alba* J.E. Smith
Pidada, see *Sonneratia caseolaris* (L.) Engl.
Pijisan, see *Drymoglossum piloselloides* (Linn.) Presl.
Pikal, see *Abrus precatorius* L.
Pikat, see *Entada phaseoloides* (L.) Merr.
Piling-piling, see *Abrus precatorius* L.
Pisang-pisang laut, see *Kandelia candel* (L.) Druce
Piuweh, see *Gardenia tubifera* Wall
Pohodo'elang, see *Scaevola taccada* (Gaertn.) Roxb.
Pohon Kira-kira, see *Xylocarpus granatum* Koen.
Pohon Soga, see *Peltophorum pterocarpum* (DC.) K. Heyne
Pokok Serunai, see *Wedelia biflora* (L.) DC.
Pong-pong, see *Gluta velutina* Bl.
Porang, see *Scaevola taccada* (Gaertn.) Roxb.
Posi-posi Merah, see *Sonneratia caseolaris* (L.) Engl.
Posi-posi, see *Lumnitzera littorea* (Jack) Voigt.
Posi-posi, see *Sonneratia alba* J.E. Smith
Pribo, see *Brownlowia argentata* Kurz.
Prumpung, see *Phragmites karka* (Retz.) Trin. ex Steud.
Prumpungan, see *Cyperus compactus* Retz.
Puang Tawang, see *Tristellateia australasiae* A. Rich.
Pulas laut, see *Mischocarpus sundaicus* Blume
Pulut-pulut, see *Kandelia candel* (L.) Druce
Punaga, see *Calophyllum inophyllum* L.
Punaga, see *Calophyllum inophyllum* L.
Purnamasada, see *Cordia subcordata* Lam.
Purun, see *Fimbristylis ferruginea* (L.) Vahl
Putat Sungai, see *Barringtonia racemosa* (L.) Spreng.
Putat, see *Barringtonia acutangula* (L.) Gaertn.
Putat, see *Barringtonia racemosa* (L.) Spreng.
Putut, see *Bruguiera gymnorrhiza* (L.) Lamk.
Rabut loteng, see *Derris scandens* (Aubl.) Pittier
Rala, see *Vitex ovata* Thunb.
Rambai Laut, see *Cassine viburnifolia* (Juss.) Ding Hou
Rambai, see *Sonneratia caseolaris* (L.) Engl.
Rambut Putri, see *Cassytha filiformis* Linn.
Rampansi, see *Ardisia elliptica* Thunberg
Randai, see *Lumnitzera littorea* (Jack) Voigt.
Raoaimarinu, see *Ryssopterys timoriensis* (DC.) Jussieu
Rappae-rappae, see *Clerodendrum inerme* (L.) Gaertn.
Rapus, see *Quassia indica* (Gaertn.) Nooteboom
Raru, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Rebha Core Koko, see *Cynodon dactylon* (L.) Pers.
Rebha Kaproleam, see *Fimbristylis polytrichoides* (Retz.) R. Br.
Rebha sekem-sekeman, see *Zoysia matrella* (L.) Merr.
Reduk, see *Scirpus grossus* Linné
Regil, see *Mischocarpus sundaicus* Blume

Remek getih, see *Stachytarpheta jamaicensis* (L.) Vahl
Remugak, see *Passiflora foetida* L.
Rengas Ayer, see *Gluta velutina* Bl.
Rengas Pantai, see *Gluta velutina* Bl.
Rengas Pendek, see *Gluta velutina* Bl.
Rengas, see *Gluta velutina* Bl.
Resak, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Riang Laut, see *Lumnitzera littorea* (Jack) Voigt.
Rotan Bakau, see *Calamus erinaceus* (Becc.) Dransfield
Rotan Dapit, see *Flagellaria indica* L.
Rotan Dini, see *Flagellaria indica* L.
Rotan Kroh, see *Flagellaria indica* L.
Rotan Laki, see *Flagellaria indica* L.
Rotan Macik, see *Flagellaria indica* L.
Ru, see *Casuarina equisetifolia* L.
Rukam laka, see *Scolopia macrophylla* (W. & A.) Clos
Rukem Betina, see *Scolopia macrophylla* (W. & A.) Clos
Rumah Semut Hitam, see *Hydnophytum formicarum* Jack
Rumput asinan, see *Paspalum vaginatum* Sw.
Rumput bilulang, see *Xerochloa imberbis* R. Br.
Rumput Kuluwing, see *Cyperus malaccensis* Lamk.
Rumput peking, see *Zoysia matrella* (L.) Merr.
Rumung, see *Heritiera littoralis* Dryand.
Rurun, see *Heritiera littoralis* Dryand.
Sabrise, see *Terminalia catappa* L.
Sadina, see *Terminalia catappa* L.
Saga buncik, see *Abrus precatorius* L.
Saga, see *Abrus precatorius* L.
Saghakan, see *Abrus precatorius* L.
Sakat Ribu-ribu, see *Drymoglossum piloselloides* (Linn.) Presl.
Sakelan, see *Melaleuca cajuputi* Roxb.
Sakot Kelembai, see *Dendrobium pachyphyllum* (O.K.) Bakh. f.
Sala-sala, see *Bruguiera gymnorrhiza* (L.) Lamk.
Salimolé, see *Cordia subcordata* Lam.
Salimuli, see *Thespesia populnea* (L.) Soland. ex Correa
Salinsa, see *Barringtonia acutangula* (L.) Gaertn.
Salira, see *Acronychia pedunculata* (L.) Miq.
Sambang, see *Lasia spinosa* (L.) Thwaites
Sambiring, see *Planchonella obovata* (R.Br.) Pierre.
Sambuta, see *Excoecaria agallocha* L.
Sampi, see *Lasia spinosa* (L.) Thwaites
Sana keeling, see *Derris pinnata* (Lour.) Prain
Sana sungu, see *Derris pinnata* (Lour.) Prain
Sangari, see *Vitex ovata* Thunb.
Sangga Langit, see *Cassytha filiformis* Linn.
Sangi, see *Dolichandrone spathacea* (l.f.) K.Schum.
Sangir Langit, see *Cassytha filiformis* Linn.
Sariboe, see *Corypha saribus* Lour.
Sarirah, see *Acronychia pedunculata* (L.) Miq.

Sarisa, see *Terminalia catappa* L.
Sarisei, see *Terminalia catappa* L.
Saruni, see *Wedelia biflora* (L.) DC.
Sayur kambing, see *Premna obtusifolia* R. Br.
Sayur Kelapa, see *Cycas rumphii* Miq.
Sekar laru, see *Stachytarpheta jamaicensis* (L.) Vahl
Semur, see *Crinum asiaticum* L.
Sendudok Air, see *Ochthocharis bornensis* Bl.
Senduduk, see *Melastoma malabathricum* var. *malabathricum* L.
Senggani, see *Melastoma malabathricum* var. *malabathricum* L.
Sentigi, see *Pemphis acidula* J.R. & G. Forst.
Senumpol, see *Atuna racemosa ssp. racemosa* Rafin.
Sepang, see *Combretum trifoliatum* Vent.
Serdang, see *Corypha saribus* Lour.
Seremai, see *Wedelia biflora* (L.) DC.
Serilang, see *Acronychia pedunculata* (L.) Miq.
Sernai, see *Wedelia biflora* (L.) DC.
Serunai Laut, see *Wedelia biflora* (L.) DC.
Seruni, see *Wedelia biflora* (L.) DC.
Sesak, see *Lumnitzera littorea* (Jack) Voigt.
Sesiil, see *Barringtonia racemosa* (L.) Spreng.
Sesira, see *Acronychia pedunculata* (L.) Miq.
Sesop, see *Lumnitzera littorea* (Jack) Voigt.
Seyawu saloyon, see *Ipomoea gracilis* R. Br.
Siba-siba, see *Cycas rumphii* Miq.
Sicancang, see *Allophylus cobbe* (L.) Raeusch.
Sijangè, see *Allophylus cobbe* (L.) Raeusch.
Silu Tasi, see *Pemphis acidula* J.R. & G. Forst.
Simaralah, see *Horsfieldia irya* (Gaertn.) Warb.
Simbar Layangan, see *Drynaria rigidula* (Sw.) Bedd.
Simbar Layangan, see *Drynaria sparsisora* (Desv.) Moore
Simbar menjangan, see *Platycerium coronarium* (Koenig.) Desv.
Simbar, see *Drynaria sparsisora* (Desv.) Moore
Simbole, see *Entada phaseoloides* (L.) Merr.
Simpuru, see *Lophopyxis maingayi* Hook.f.
Sira, see *Intsia bijuga* (Colebr.) Kuntze
Sirisal, see *Terminalia catappa* L.
Siron, see *Hibiscus tiliaceus* L.
Sisik Naga, see *Drymoglossum piloselloides* (Linn.) Presl.
Siureuh, see *Blumeodendron tokbrai* (Bl.) Kurz.
Sobi, see *Derris scandens* (Aubl.) Pittier
Soga, see *Peltophorum pterocarpum* (DC.) K. Heyne
Sompini, see *Caesalpinia bonduc* (L.) Roxb.
Sompini, see *Caesalpinia crista* L.
Songsong Harus, see *Combretum tetralophum* Clarke
Sono keling, see *Derris pinnata* (Lour.) Prain
Sosa, see *Cyperus javanicus* Houtt.
Subang-subang, see *Scaevola taccada* (Gaertn.) Roxb.
Subeng-subeng, see *Scaevola taccada* (Gaertn.) Roxb.

Suket Dem, see *Cyperus malaccensis* Lamk.
Suket Dot, see *Fimbristylis ferruginea* (L.) Vahl
Suket Godokan, see *Fimbristylis ferruginea* (L.) Vahl
Suket Grinting, see *Cynodon dactylon* (L.) Pers.
Suket, see *Cyperus compactus* Retz.
Sulang Watu, see *Fimbristylis cymosa* R. Br.
Sungsung Arus, see *Combretum tetralophum* Clarke
Susong Harus, see *Combretum tetralophum* Clarke
Susung Arus, see *Combretum tetralophum* Clarke
Taburuh, see *Lophopyxis maingayi* Hook.f.
Taheup, see *Bruguiera gymnorrhiza* (L.) Lamk.
Talas, see *Colocasia esculenta* (L.) Schott
Tales, see *Colocasia esculenta* (L.) Schott
Tali Putri, see *Cassytha filiformis* Linn.
Tali Sasawi, see *Lophopyxis maingayi* Hook.f.
Talise, see *Barringtonia asiatica* (L.) Kurz
Talisei, see *Terminalia catappa* L.
Tangar, see *Ceriops tagal* (Perr.) C.B. Rob.
Tangkal Daon, see *Nypa fruticans* Wurmb.
Tangkele, see *Kleinhovia hospita* L..
Taning bajang, see *Abrus precatorius* L.
Tanjang, see *Bruguiera cylindrica* (L.) Bl.
Tanjang, see *Bruguiera gymnorrhiza* (L.) Lamk.
Tanjang, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Tanjang, see *Bruguiera sexangula* (Lour.) Poir.
Tanjang Sukim, see *Bruguiera cylindrica* (L.) Bl.
Tanjong Jawa, see *Symplocos celastrifolia* Griff. ex Clarke
Tanjong-tanjong, see *Symplocos celastrifolia* Griff. ex Clarke
Taruntung, see *Lumnitzera littorea* (Jack) Voigt.
Tasi, see *Guettarda speciosa* Linn.
Tasi, see *Terminalia catappa* L.
Tatampayan besar, see *Ipomoea tuba* Schlechtend.
Tatepal, see *Phragmites karka* (Retz.) Trin. ex Steud.
Tatupele, see *Phragmites karka* (Retz.) Trin. ex Steud.
Taualis, see *Osbornia octodonta* F.v.Muell.
Tawi, see *Symplocos celastrifolia* Griff. ex Clarke
Tekere, see *Eleocharis dulcis* (Burm. f.) Henschel
Teki Parang, see *Fimbristylis cymosa* R. Br.
Teki Tike, see *Eleocharis dulcis* (Burm. f.) Henschel
Teki, see *Eleocharis dulcis* (Burm. f.) Henschel
Tekurung, see *Blumeodendron tokbrai* (Bl.) Kurz.
Telekan, see *Trianthema portulacastrum* L.
Temahau, see *Kleinhovia hospita* L..
Temampapu, see *Cordia dichotoma* G. Forst.
Tembaga Suasa, see *Crinum asiaticum* L.
Tenggel, see *Bruguiera gymnorrhiza* (L.) Lamk.
Teo-teo, see *Cordia dichotoma* G. Forst.
Teruntum, see *Lumnitzera racemosa* Willd.
Teruntun, see *Aegiceras corniculatum* (L.) Blanco

Teruntun, see *Aegiceras floridum* Roemer & Schultes
Teruntung, see *Aegiceras corniculatum* (L.) Blanco
Tike, see *Eleocharis dulcis* (Burm. f.) Henschel
Tiliho, see *Terminalia catappa* L.
Ting, see *Bruguiera sexangula* (Lour.) Poir.
Tingi, see *Ceriops decandra* (Griff.) Ding Hou
Tingih, see *Ceriops tagal* (Perr.) C.B. Rob.
Tingting, see *Combretum tetralophum* Clarke
Titi Laut, see *Guettarda speciosa* Linn.
Tokbrai, see *Blumeodendron tokbrai* (Bl.) Kurz.
Tolok, see *Inocarpus fagifer* (Parkinson) Fosb.
Tomana, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tomatangtang, see *Cordia dichotoma* G. Forst.
Tomo, see *Bruguiera gymnorrhiza* (L.) Lamk.
Tongke Perampuan, see *Bruguiera sexangula* (Lour.) Poir.
Tongke, see *Bruguiera gymnorrhiza* (L.) Lamk.
Toteo, see *Cordia dichotoma* G. Forst.
Toweran, see *Derris trifoliata* Lour
Toyokuku, see *Diospyros malabarica* (Descr.) Kostel.
Tuba Abal, see *Derris trifoliata* Lour
Tuba biji, see *Anamirta cocculus* L. Wight & Arn.
Tuba Laut, see *Derris trifoliata* Lour
Tudung Laut, see *Aegiceras corniculatum* (L.) Blanco
Tumu, see *Bruguiera gymnorrhiza* (L.) Lamk.
Tumu, see *Bruguiera sexangula* (Lour.) Poir.
Turak, see *Dischidia nummularia* R.Br.
Tutu pupu, see *Asplenium nidus* Linné
Tuw, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tuwa Areuy, see *Derris trifoliata* Lour
Tuwe-ej, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tuwung, see *Caesalpinia bonduc* (L.) Roxb.
Tuwung, see *Caesalpinia crista* L.
Ukayu Datu, see *Cycas rumphii* Miq.
Urek-urek Polo, see *Hydnophytum formicarum* Jack
Urek-urek Polo, see *Myrmecodia tuberosa* DC.
Waba, see *Cerbera manghas* L.
Waba, see *Cerbera odollam* Gaertn.
Wahat Merah, see *Sonneratia caseolaris* (L.) Engl.
Wahat Putih, see *Sonneratia alba* J.E. Smith
Wakat Besi, see *Pemphis acidula* J.R. & G. Forst.
Wakati, see *Hibiscus tiliaceus* L.
Wali Ahuhun, see *Aganope heptaphylla* (L.) Polhill
Walik elar, see *Mischocarpus sundaicus* Blume
Walingi, see *Scirpus grossus* Linné
Walini, see *Typha angustifolia* Linné
Wama-wama, see *Ximenia americana* L.
Waran pisang, see *Anamirta cocculus* L. Wight & Arn.
Waru galang Iren, see *Melaleuca cajuputi* Roxb.
Waru Laut, see *Hibiscus tiliaceus* L.

Waru Laut, see *Thespesia populnea* (L.) Soland. ex Correa
Waru Lenga, see *Hibiscus tiliaceus* L.
Waru Lengis, see *Hibiscus tiliaceus* L.
Waru Lot, see *Hibiscus tiliaceus* L.
Waru Lot, see *Thespesia populnea* (L.) Soland. ex Correa
Waru Pantai, see *Thespesia populnea* (L.) Soland. ex Correa
Waru, see *Casuarina equisetifolia* L.
Waru, see *Hibiscus tiliaceus* L.
Watata Ruruan, see *Ipomoea pes-capre* (L.) Sweet.
Wawalingian, see *Typha angustifolia* Linné
Weda, see *Phragmites karka* (Retz.) Trin. ex Steud.
Wegil, see *Mischocarpus sundaicus* Blume
Welompelong, see *Lumnitzera littorea* (Jack) Voigt.
Wesele, see *Intsia bijuga* (Colebr.) Kuntze
Wewa, see *Terminalia catappa* L.
Widuri, see *Calotropis gigantea* (L) R.Br.
Wikakas, see *Acrostichum aureum* Linné
Wintangar, see *Kleinhovia hospita* L..
Wintungtasi, see *Scaevola taccada* (Gaertn.) Roxb.
Wiri salo, see *Clerodendrum inerme* (L.) Gaertn.
Wlingen, see *Scirpus grossus* Linné
Wlingian, see *Scirpus grossus* Linné
Wowo, see *Flagellaria indica* L.
Wrekas, see *Acrostichum aureum* Linné
Wunut, see *Cynometra iripa* Kostel.
Wunut, see *Cynometra ramiflora* L.
Wutunu, see *Barringtonia asiatica* (L.) Kurz

Malaysian:
Akar bintong, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Akar China, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Akar Kelinci, see *Caesalpinia bonduc* (L.) Roxb.
Akar mata pelanduk, see *Loeseneriella macrantha* (Korth.) A.C. Smith
Akar Pengalasan, see *Cassytha filiformis* Linn.
Akik, see *Rhizophora apiculata* Bl.
Ambong-ambong, see *Scaevola taccada* (Gaertn.) Roxb.
Anggrek hutan, see *Dendrobium moschatum* (Buch.-Ham.) Sw.
Anggrek, see *Dendrobium subulatum* (Bl.) Lindl.
Api-api berbulu, see *Avicennia lanata* Ridley
Api-api bulu, see *Avicennia lanata* Ridley
Api-api puteh, see *Avicennia marina* (Forssk.) Vierh.
Api-api, see *Avicennia alba* Blume
Api-api, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Api-api, see *Avicennia officinalis* L.
Aru, see *Casuarina equisetifolia* L.
Asinan, see *Paspalum vaginatum* Sw.
Bakau akik, see *Rhizophora apiculata* Bl.
Bakau belukap, see *Bruguiera cylindrica* (L.) Bl.
Bakau belukap, see *Rhizophora mucronata* Lamk.

Bakau belukap, see *Rhizophora stylosa* Griff.
Bakau berus, see *Bruguiera cylindrica* (L.) Bl.
Bakau besar, see *Bruguiera gymnorrhiza* (L.) Lamk.
Bakau gelukap, see *Rhizophora mucronata* Lamk.
Bakau gelukap, see *Rhizophora stylosa* Griff.
Bakau hitam, see *Rhizophora mucronata* Lamk.
Bakau hitam, see *Rhizophora stylosa* Griff.
Bakau jankar, see *Rhizophora mucronata* Lamk.
Bakau jankar, see *Rhizophora stylosa* Griff.
Bakau kecil, see *Bruguiera cylindrica* (L.) Bl.
Bakau kurap, see *Rhizophora mucronata* Lamk.
Bakau kurap, see *Rhizophora stylosa* Griff.
Bakau minyak, see *Rhizophora apiculata* Bl.
Bakau puteh, see *Bruguiera cylindrica* (L.) Bl.
Bakau puteh, see *Rhizophora apiculata* Bl.
Bakau tandok, see *Rhizophora apiculata* Bl.
Bakau, see *Bruguiera exaristata* Ding Hou
Baru, see *Hibiscus tiliaceus* L.
Baru-baru, see *Hibiscus tiliaceus* L.
Batata Pantai, see *Ipomoea pes-capre* (L.) Sweet.
Bebaru bulu, see *Hibiscus tiliaceus* L.
Bebaru, see *Hibiscus tiliaceus* L.
Bebaru, see *Thespesia populnea* (L.) Soland. ex Correa
Bedara laut, see *Ximenia americana* L.
Begau, see *Eleocharis dulcis* (Burm. f.) Henschel
Beluntas, see *Pluchea indica* (L.) Less.
Benaga, see *Calophyllum inophyllum* L.
Benjek, see *Inocarpus fagifer* (Parkinson) Fosb.
Beras-beras, see *Kandelia candel* (L.) Druce
Berembang, see *Sonneratia caseolaris* (L.) Engl.
Berus Mata Buaya, see *Bruguiera hainessii* C.G.Rogers
Berus-berus, see *Kandelia candel* (L.) Druce
Betut, see *Bruguiera gymnorrhiza* (L.) Lamk.
Bidari, see *Ximenia americana* L.
Biga, see *Eleocharis dulcis* (Burm. f.) Henschel
Bintangur Laut, see *Calophyllum inophyllum* L.
Bonduc, see *Caesalpinia bonduc* (L.) Roxb.
Bosang, see *Bruguiera cylindrica* (L.) Bl.
Bosua, see *Inocarpus fagifer* (Parkinson) Fosb.
Buah keras laut, see *Hernandia ovigera* L.
Bubpuk, see *Ilex cymosa* Blume
Bundung, see *Cyperus malaccensis* Lamk.
Bungor, see *Pemphis acidula* J.R. & G. Forst.
Bunyung, see *Cyperus malaccensis* Lamk.
Busing, see *Bruguiera sexangula* (Lour.) Poir.
Buta buta, see *Cerbera manghas* L.
Buta buta, see *Cerbera odollam* Gaertn.
Buta-Buta, see *Excoecaria agallocha* L.
Butong, see *Barringtonia asiatica* (L.) Kurz

Butun, see *Barringtonia asiatica* (L.) Kurz
Cemar, see *Cassytha filiformis* Linn.
Chempaka utan, see *Gardenia tubifera* Wall
Dadap, see *Erythrina orientalis* (L.) Murr.
Damak-damak, see *Scolopia macrophylla* (W. & A.) Clos
Dangsa, see *Phoenix paludosa* Roxb.
Daun kambing, see *Premna obtusifolia* R. Br.
Daun Katang, see *Ipomoea pes-capre* (L.) Sweet.
Daun korpa , see *Dischidia benghalensis* Colebr.
Daun Korpo, see *Finlaysonia obovata* Wall.
Daun pitis kecil, see *Dischidia benghalensis* Colebr.
Daun seberneh panjang, see *Drymoglossum piloselloides* (Linn.) Presl.
Daun Songa, see *Wedelia biflora* (L.) DC.
Dedahruang, see *Rapanea porteriana* Wall. ex A. DC.
Dedap, see *Erythrina orientalis* (L.) Murr.
Demundi, see *Vitex ovata* Thunb.
Derdap, see *Erythrina orientalis* (L.) Murr.
Dungun besar, see *Heritiera globosa* Kostermans
Dungun laut, see *Heritiera littoralis* Dryand.
Dungun, see *Brownlowia argentata* Kurz.
Dungun, see *Brownlowia tersa* (L.) Kosterm.
Dungun, see *Heritiera littoralis* Dryand.
Durian laut, see *Brownlowia argentata* Kurz.
Gambir laut, see *Clerodendrum inerme* (L.) Gaertn.
Gedabu, see *Sonneratia ovata* Back.
Gelam, see *Melaleuca cajuputi* Roxb.
Gelang, see *Sesuvium portulacastrum* (L.) L.
Gurah, see *Excoecaria indica* (Willd.) Muell. Arg.
Hitam, see *Acanthus ebracteatus* Vahl.
Jambu kera, see *Glochidion littorale* Bl.
Jambulan pantai, see *Ardisia elliptica* Thunberg
Jangon, see *Atuna racemosa ssp. racemosa* Rafin.
Jarak, see *Ricinus communis* L.
Jati bukit, see *Podocarpus polystachyus* R.Br. ex Endl.
Jawi jawi, see *Ficus microcarpa* L.f.
Jejawi, see *Ficus microcarpa* L.f.
Jemerlang Laut, see *Peltophorum pterocarpum* (DC.) K. Heyne
Jempalang, see *Barringtonia acutangula* (L.) Gaertn.
Jeruju puteh, see *Acanthus ilicifolius* L .
Jeruju, see *Acanthus ebracteatus* Vahl.
Jeruju, see *Acanthus volubilis* Wall.
Jukut Kakawatan, see *Cynodon dactylon* (L.) Pers.
Jukut Raket, see *Cynodon dactylon* (L.) Pers.
Kacang Kayu Laut, see *Pongamia pinnata* (L.) Pierre
Kacang Laut, see *Canavalia maritima* Thouars
Kachang kachang, see *Aegiceras corniculatum* (L.) Blanco
Kambing-kambing, see *Sarcolobus globosus* Wall.
Kankong, see *Ipomoea gracilis* R. Br.
Kapit, see *Inocarpus fagifer* (Parkinson) Fosb.

Karamunting, see *Ochthocharis bornensis* Bl.
Kateng, see *Cynometra iripa* Kostel.
Kateng, see *Cynometra ramiflora* L.
Katong laut, see *Cynometra iripa* Kostel.
Katong laut, see *Cynometra ramiflora* L.
Kayu buta-buta, see *Excoecaria agallocha* L.
Kayu Puteh, see *Melaleuca cajuputi* Roxb.
Kekara Laut, see *Canavalia maritima* Thouars
Kekara pedang, see *Canavalia maritima* Thouars
Keladi Payau, see *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott
Keladi, see *Colocasia esculenta* (L.) Schott
Kemedu, see *Morinda citrifolia* L.
Kerepit, see *Inocarpus fagifer* (Parkinson) Fosb.
Keretung, see *Blumeodendron tokbrai* (Bl.) Kurz.
Ketapang, see *Terminalia catappa* L.
Kodak acing, see *Olax imbricata* Roxb.
Komoi, see *Diospyros malabarica* (Descr.) Kostel.
Korma Paya, see *Phoenix paludosa* Roxb.
Kumun, see *Diospyros malabarica* (Descr.) Kostel.
Lagarteiro (Sabah), see *Croton heterocarpus* Müll. Arg.
Lagundi, see *Vitex ovata* Thunb.
Laki -laki, see *Finlaysonia obovata* Wall.
Landing-landing, see *Ceriops decandra* (Griff.) Ding Hou
Langkong, see *Barringtonia acutangula* (L.) Gaertn.
Lemau lilang, see *Merope angulata* (Willd.) Swingle
Lembang, see *Typha angustifolia* Linné
Lemuning, see *Vitex ovata* Thunb.
Lenggadai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Lenggadis, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Lenggundi, see *Vitex ovata* Thunb.
Limau Hantu, see *Atalantia monophylla* DC.
Limau Lelang, see *Merope angulata* (Willd.) Swingle
Lunok, see *Ficus microcarpa* L.f.
Malabera, see *Fagraea crenulata* Maingay ex C.B. Clarke
Margimaly (Sarawak), see *Croton heterocarpus* Müll. Arg.
Masiang, see *Scirpus grossus* Linné
Mata ayam, see *Ardisia elliptica* Thunberg
Mata itek, see *Ardisia elliptica* Thunberg
Mata pelanduk, see *Ardisia elliptica* Thunberg
Melokan, see *Croton heterocarpus* Müll. Arg.
Membatu, see *Atuna racemosa ssp. racemosa* Rafin.
Mempisang, see *Kandelia candel* (L.) Druce
Menaga, see *Calophyllum inophyllum* L.
Menasi, see *Planchonella obovata* (R.Br.) Pierre.
Mendarong, see *Scirpus grossus* Linné
Mengkadai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Mengkudu besar, see *Morinda citrifolia* L.
Mengkudu daun besar, see *Morinda citrifolia* L.
Mensiang, see *Scirpus grossus* Linné

Mensirah, see *Ilex cymosa* Blume
Mentiong, see *Gardenia tubifera* Wall
Menurong, see *Scirpus grossus* Linné
Merambong, see *Scaevola taccada* (Gaertn.) Roxb.
Merbau ipil, see *Intsia bijuga* (Colebr.) Kuntze
Meribut, see *Olax imbricata* Roxb.
Merlimau, see *Atalantia monophylla* DC.
Misi, see *Planchonella obovata* (R.Br.) Pierre.
Muning, see *Vitex ovata* Thunb.
Murong, see *Scirpus grossus* Linné
Naga, see *Calophyllum inophyllum* L.
Nibung, see *Oncosperma tigillarium* (Jack.) Ridl.
Nikong, see *Oncosperma tigillarium* (Jack.) Ridl.
Niri, see *Xylocarpus granatum* Koen.
Niri, see *Xylocarpus rumphii* (Kostel.) Mabb.
Nona burung, see *Cordia dichotoma* G. Forst.
Nyan, see *Cerbera manghas* L.
Nyan, see *Cerbera odollam* Gaertn.
Nyireh batu, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Nyireh Bunga, see *Xylocarpus granatum* Koen.
Nyireh hudang, see *Xylocarpus granatum* Koen.
Nyireh, see *Xylocarpus granatum* Koen.
Nyireh, see *Xylocarpus rumphii* (Kostel.) Mabb.
Nyiri, see *Xylocarpus granatum* Koen.
Pakis sarang semut, see *Myrmecophila sinuosa* (Wall. ex Hook.) Nakai ex Hito
Paku achu, see *Calophyllum inophyllum* L.
Paku akar, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku gajah, see *Cycas rumphii* Miq.
Paku haji, see *Cycas rumphii* Miq.
Paku laut, see *Cycas rumphii* Miq.
Paku midung, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku naga, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku Pandan, see *Asplenium nidus* Linné
Paku ramu, see *Stenochlaena palustris* (Burm. f.) Bedd.
Paku Wanggi, see *Phymatodes scolopendria* (Burm.) Ching.
Palas duri, see *Licuala spinosa* Wurmb.
Palas, see *Licuala spinosa* Wurmb.
Pandan laut, see *Pandanus tectorius* Sol
Pedada, see *Sonneratia alba* J.E. Smith
Pedada, see *Sonneratia griffithii* Kurz.
Pekan heran, see *Gardenia tubifera* Wall
Pelampong, see *Scaevola taccada* (Gaertn.) Roxb.
Pelawas, see *Calycopteris floribunda* (Roxb.) Lamk
Peler kambing, see *Sarcolobus globosus* Wall.
Penaga laut, see *Calophyllum inophyllum* L.
Penah, see *Ardisia elliptica* Thunberg
Penggu, see *Horsfieldia irya* (Gaertn.) Warb.
Perepat, see *Sonneratia alba* J.E. Smith
Periah, see *Ardisia elliptica* Thunberg

Pertun, see *Barringtonia asiatica* (L.) Kurz
Petekat, see *Cordia dichotoma* G. Forst.
Piai laut, see *Acrostichum speciosum* Willd.
Piai Raya, see *Acrostichum aureum* Linné
Pianggu, see *Horsfieldia irya* (Gaertn.) Warb.
Pidada, see *Sonneratia alba* J.E. Smith
Pidaroh, see *Ximenia americana* L.
Pisang-pisang laut, see *Kandelia candel* (L.) Druce
Podo laut, see *Podocarpus polystachyus* R.Br. ex Endl.
Poko kulo, see *Dolichandrone spathacea* (l.f.) K.Schum.
Pokok rukam gajah, see *Scolopia macrophylla* (W. & A.) Clos
Pong pong, see *Cerbera manghas* L.
Pong pong, see *Cerbera odollam* Gaertn.
Pong-pong, see *Gluta velutina* Bl.
Pulas laut, see *Mischocarpus sundaicus* Blume
Pulut-pulut, see *Kandelia candel* (L.) Druce
Putat ayam, see *Barringtonia racemosa* (L.) Spreng.
Putat Ayer, see *Barringtonia conoidea* Griff.
Putat Laut, see *Barringtonia asiatica* (L.) Kurz
Putat, see *Barringtonia acutangula* (L.) Gaertn.
Rengas Ayer, see *Gluta velutina* Bl.
Rengas Pantai, see *Gluta velutina* Bl.
Rengas, see *Gluta velutina* Bl.
Rotan Bakau, see *Calamus erinaceus* (Becc.) Dransfield
Rotan Tikus, see *Flagellaria indica* L.
Ru, see *Casuarina equisetifolia* L.
Rukem Laut, see *Scolopia macrophylla* (W. & A.) Clos
Rumah Semut Merah, see *Myrmecodia tuberosa* DC.
Rumput laut, see *Myriostachya wightiana* (Nees ex Steud.) Hook.f.
Rumput Lingsing, see *Cyperus javanicus* Houtt.
Rumput Ruchut, see *Fimbristylis ferruginea* (L.) Vahl
Saga, see *Abrus precatorius* L.
Sakat Hitam, see *Phymatodes scolopendria* (Burm.) Ching.
Sakat ribu-ribu, see *Drymoglossum piloselloides* (Linn.) Presl.
Sapokei (Sabah), see *Croton heterocarpus* Müll. Arg.
Sarai, see *Cyperus javanicus* Houtt.
Sari pelanduk, see *Croton heterocarpus* Müll. Arg.
Saruni Air, see *Sesuvium portulacastrum* (L.) L.
Sayur kambing, see *Premna obtusifolia* R. Br.
Sechirik laut, see *Diospyros ferrea* (Willd.) Bakh.
Sekendai, see *Cordia dichotoma* G. Forst.
Sekendal, see *Cordia dichotoma* G. Forst.
Selar Makan, see *Guettarda speciosa* Linn.
Selensur, see *Glochidion littorale* Bl.
Semun bidadari, see *Platycerium coronarium* (Koenig.) Desv.
Sendudok Air, see *Ochthocharis bornensis* Bl.
Senduduk, see *Melastoma malabathricum* var. *malabathricum* L.
Sepetir mempelas, see *Sindora siamensis* var. *maritima* (Pierre) K. & SS. Larsen
Serdang, see *Corypha saribus* Lour.

Sisek naga, see *Drymoglossum piloselloides* (Linn.) Presl.
Sugi, see *Mischocarpus sundaicus* Blume
Sulengseng, see *Cyperus javanicus* Houtt.
Tali Berkumpul, see *Aganope heptaphylla* (L.) Polhill
Tamu (Sabah), see *Croton heterocarpus* Müll. Arg.
Tapak Kuda Kecil, see *Ipomoea gracilis* R. Br.
Tapak Kuda, see *Ipomoea pes-capre* (L.) Sweet.
Tatampayan besar, see *Ipomoea tuba* Schlechtend.
Tebu Salah, see *Phragmites karka* (Retz.) Trin. ex Steud.
Temahau, see *Kleinhovia hospita* L..
Tengah, see *Ceriops tagal* (Perr.) C.B. Rob.
Tengal, see *Ceriops decandra* (Griff.) Ding Hou
Tengar, see *Ceriops decandra* (Griff.) Ding Hou
Tengar, see *Ceriops tagal* (Perr.) C.B. Rob.
Teruntum Merah, see *Lumnitzera littorea* (Jack) Voigt.
Teruntum, see *Lumnitzera littorea* (Jack) Voigt.
Timah-timah, see *Ilex cymosa* Blume
Timun dendang, see *Passiflora foetida* L.
Timun hutan, see *Passiflora foetida* L.
Timun padang, see *Passiflora foetida* L.
Tuj, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tumbus, see *Bruguiera gymnorrhiza* (L.) Lamk.
Tumu berau, see *Bruguiera sexangula* (Lour.) Poir.
Tumu mata buaya, see *Bruguiera sexangula* (Lour.) Poir.
Tumu, see *Bruguiera gymnorrhiza* (L.) Lamk.
Tumus, see *Bruguiera gymnorrhiza* (L.) Lamk.
Waru, see *Casuarina equisetifolia* L.
Wlingi Laut, see *Cyperus malaccensis* Lamk.

Myanmar:
Kanazo, see *Heritiera fomes* Buch. Ham.
Kaya, see *Aegiceras corniculatum* (L.) Blanco
Kyana, see *Xylocarpus granatum* Koen.
Madame, see *Ceriops decandra* (Griff.) Ding Hou
Madame, see *Ceriops tagal* (Perr.) C.B. Rob.
Mong-tain, see *Cycas rumphii* Miq.
Myinga, see *Cynometra ramiflora* L.
Pin-lay-see, see *Ximenia americana* L.
Pinle-kanazo, see *Heritiera littoralis* Dryand.
Thame, see *Avicennia officinalis* L.
Thayaw, see *Excoecaria agallocha* L.

Papua New Guinean:
Ahake, see *Batis argillicola* van Royen
Aikanu, see *Stemonurus ammui* (Kaneh.) Sleum.
Aikove, see *Polyscias macgillivrayi* (Seem.) Harms.
Ailalo see *Stemonurus ammui* (Kaneh.) Sleum.
Aimarako see *Stemonurus ammui* (Kaneh.) Sleum.
Ainunura see *Stemonurus ammui* (Kaneh.) Sleum.

Ammui see *Stemonurus ammui* (Kaneh.) Sleum.
Arara, see *Bruguiera gymnorrhiza* (L.) Lamk.
Asikua, see *Atuna racemosa* ssp. racemosa Rafin.
Asista, see *Atuna racemosa* ssp. *racemosa* Rafin.
Awol, see *Xylocarpus granatum* Koen.
Bata-bata, see *Atuna racemosa* ssp. *racemosa* Rafin.
Biagi, see *Eleocharis dulcis* (Burm. f.) Henschel
Dodogo kubar, see *Scaevola taccada* (Gaertn.) Roxb.
Ecahi, see *Xylocarpus granatum* Koen.
Gambou, see *Polyscias macgillivrayi* (Seem.) Harms.
Geida, see *Cyperus malaccensis* Lamk.
Kaav, see *Xylocarpus granatum* Koen.
Kabahai, see *Xylocarpus rumphii* (Kostel.) Mabb.
Kaikikira, see *Scaevola taccada* (Gaertn.) Roxb.
Kalis, see *Terminalia catappa* L.
Koriki, see *Rhizophora mucronata* Lamk.
Koriki, see *Rhizophora stylosa* Griff.
Kris, see *Terminalia catappa* L.
Latita, see *Atuna racemosa* ssp. *racemosa* Rafin.
Latiu, see *Dolichandrone spathacea* (l.f.) K.Schum.
Mala Sata see *Stemonurus ammui* (Kaneh.) Sleum.
Manggaresi, see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Mapeke, see *Bruguiera gymnorrhiza* (L.) Lamk.
Mokkemoffe, see *Xylocarpus granatum* Koen.
Naikaigwoo, see *Polyscias macgillivrayi* (Seem.) Harms.
Pabo, see *Rhizophora mucronata* Lamk.
Pabo, see *Rhizophora stylosa* Griff.
Paimeh, see *Scaevola taccada* (Gaertn.) Roxb.
Raumonas, see *Polyscias macgillivrayi* (Seem.) Harms.
Runge, see *Terminalia catappa* L.
Saki, see *Atuna racemosa* ssp. *racemosa* Rafin.
Tawihi, see *Xylocarpus rumphii* (Kostel.) Mabb.
Tew, see *Combretum trifoliatum* Vent.
Togo, see *Rhizophora mucronata* Lamk.
Togo, see *Rhizophora stylosa* Griff.
Tortor, see *Rhizophora mucronata* Lamk.
Tortor, see *Rhizophora stylosa* Griff.
Totoa, see *Rhizophora mucronata* Lamk.
Totoa, see *Rhizophora stylosa* Griff.
Vabilisi, see *Merrilliodendron megacarpum* (Hemsl.) Sleum.
Wadawada, see *Xylocarpus rumphii* (Kostel.) Mabb.
Wampi lang, see *Cyperus compactus* Retz.
Wapi lang, see *Cyperus javanicus* Houtt.

Philippine:
Agás, see *Scirpus grossus* Linné
Agnaa, see *Lumnitzera littorea* (Jack) Voigt.
Agnaya, see *Lumnitzera racemosa* Willd.
Agnaya, see *Scyphiphora hydrophyllacea* Gaertn. f.

Agoho, see *Casuarina equisetifolia* L.
Agonoi, see *Wedelia biflora* (L.) DC.
Aguia Anilai, see *Lumnitzera littorea* (Jack) Voigt.
Agunoi, see *Wedelia biflora* (L.) DC.
Alagot-ot, see *Cordia subcordata* Lam.
Alai, see *Bruguiera sexangula* (Lour.) Poir.
Alipata, see *Excoecaria agallocha* L.
Almendras, see *Terminalia catappa* L.
Almendro, see *Terminalia catappa* L.
Aluma, see *Atuna racemosa ssp. racemosa* Rafin.
Amarok-barok, see *Pongamia pinnata* (L.) Pierre
Angasin, see *Tristellateia australasiae* A. Rich.
Anoioi, see *Wedelia biflora* (L.) DC.
Anudd, see *Flagellaria indica* L.v
Api-api, see *Avicennia alba* Blume
Api-api, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Api-api, see *Avicennia marina* (Forssk.) Vierh.
Apung-apung, see *Kleinhovia hospita* L..
Aragan, see *Najas indica* (Willd.) Cham.
Aranaya, see *Scyphiphora hydrophyllacea* Gaertn. f.
Arbon, see *Cerbera manghas* L.
Arinaya, see *Scyphiphora hydrophyllacea* Gaertn. f.
Arodaidai, see *Ipomoea pes-capre* (L.) Sweet.
Array, see *Anamirta cocculus* L. Wight & Arn.
Audi, see *Flagellaria indica* L.
Audi-si-gayang, see *Flagellaria indica* L.
Ayam, see *Trianthema portulacastrum* L.
Baga-as, see *Cyperus malaccensis* Lamk.
Bagaolan, see *Guettarda speciosa* Linn.
Bagit, see *Tristellateia australasiae* A. Rich.
Bagnang-lalake, see *Glochidion littorale* Bl.
Bagnei, see *Pongamia pinnata* (L.) Pierre
Bagnit, see *Tristellateia australasiae* A. Rich.
Bago, see *Hibiscus tiliaceus* L.
Bahau, see *Tristellateia australasiae* A. Rich.
Bait, see *Cycas rumphii* Miq.
Bakau, see *Bruguiera gymnorrhiza* (L.) Lamk.
Bakau, see *Rhizophora apiculata* Bl.
Bakau, see *Rhizophora mucronata* Lamk.
Bakau, see *Rhizophora stylosa* Griff.
Bakauan baler, see *Kandelia candel* (L.) Druce
Bakauan bato, see *Rhizophora stylosa* Griff.
Bakauan lalaki, see *Bruguiera sexangula* (Lour.) Poir.
Bakauan lalaki, see *Rhizophora apiculata* Bl.
Bakauan, see *Bruguiera cylindrica* (L.) Bl.
Bakauan, see *Bruguiera gymnorrhiza* (L.) Lamk.
Bakauan, see *Bruguiera sexangula* (Lour.) Poir.
Bakauan, see *Ceriops decandra* (Griff.) Ding Hou
Bakauan, see *Rhizophora apiculata* Bl.

Bakauan-babae, see *Rhizophora mucronata* Lamk.
Bakauan-babae, see *Rhizophora stylosa* Griff.
Bakauan-lalake, see *Rhizophora apiculata* Bl.
Bakauan-lalaki, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Bakhau, see *Rhizophora apiculata* Bl.
Bakhau, see *Rhizophora mucronata* Lamk.
Bakhau, see *Rhizophora stylosa* Griff.
Bakhaw, see *Rhizophora apiculata* Bl.
Bakhaw, see *Rhizophora mucronata* Lamk.
Bakhaw, see *Rhizophora stylosa* Griff.
Baki-baking-pula, see *Cyperus compactus* Retz.
Bakting, see *Lumnitzera littorea* (Jack) Voigt.
Balabago, see *Hibiscus tiliaceus* L.
Balagon, see *Olax imbricata* Roxb.
Balak-balak, see *Scaevola taccada* (Gaertn.) Roxb.
Balangigan, see *Guettarda speciosa* Linn.
Balangot, see *Typha angustifolia* Linné
Balansi, see *Kleinhovia hospita* L..
Balasiai, see *Scyphiphora hydrophyllacea* Gaertn. f.
Balibagan, see *Guettarda speciosa* Linn.
Balibago, see *Hibiscus tiliaceus* L.
Balikbalik, see *Pongamia pinnata* (L.) Pierre
Balinsarayan, see *Bruguiera sexangula* (Lour.) Poir.
Balitbitan, see *Cynometra ramiflora* L.
Balok, see *Pongamia pinnata* (L.) Pierre
Balok-balok, see *Pongamia pinnata* (L.) Pierre
Balok-Balok, see *Scaevola taccada* (Gaertn.) Roxb.
Balotbalot, see *Pongamia pinnata* (L.) Pierre
Balu, see *Cordia subcordata* Lam.
Balu, see *Thespesia populnea* (L.) Soland. ex Correa
Balu-balu, see *Pongamia pinnata* (L.) Pierre
Balu-balu, see *Pongamia pinnata* (L.) Pierre
Baluk-baluk, see *Pongamia pinnata* (L.) Pierre
Baluno, see *Camptostemon philippinense* (Vidal) Becc.
Balut-balut, see *Pongamia pinnata* (L.) Pierre
Banag, see *Thespesia populnea* (L.) Soland. ex Correa
Banago, see *Thespesia populnea* (L.) Soland. ex Correa
Banalo, see *Thespesia populnea* (L.) Soland. ex Correa
Banaro, see *Guettarda speciosa* Linn.
Banaro, see *Thespesia populnea* (L.) Soland. ex Correa
Bangbangi, see *Najas indica* (Willd.) Cham.
Bangkau, see *Rhizophora mucronata* Lamk.
Bangkau, see *Rhizophora stylosa* Griff.
Bango-pula, see *Thespesia populnea* (L.) Soland. ex Correa
Bani, see *Pongamia pinnata* (L.) Pierre
Banit, see *Pongamia pinnata* (L.) Pierre
Bantana, see *Kleinhovia hospita* L..
Bantigi, see *Pemphis acidula* J.R. & G. Forst.
Banting, see *Lumnitzera littorea* (Jack) Voigt.

Banung-kalauai, see *Hernandia ovigera* L.
Baobao, see *Pongamia pinnata* (L.) Pierre
Ba-ot, see *Thespesia populnea* (L.) Soland. ex Correa
Barabai, see *Cerbera manghas* L.
Baraibai, see *Cerbera manghas* L.
Basit, see *Heritiera littoralis* Dryand.
Batag-batag, see *Aegiceras corniculatum* (L.) Blanco
Batag-batag, see *Aegiceras floridum* Roemer & Schultes
Batano, see *Cerbera manghas* L.
Batano, see *Excoecaria agallocha* L.
Bating, see *Lumnitzera littorea* (Jack) Voigt.
Batulinao, see *Diospyros ferrea* (Willd.) Bakh.
Bauan, see *Hibiscus tiliaceus* L.
Baut, see *Heritiera littoralis* Dryand.
Bayag-kabayo, see *Heritiera littoralis* Dryand.
Bayok-bayok, see *Pongamia pinnata* (L.) Pierre
Bigi, see *Xylocarpus granatum* Koen.
Bignon, see *Kleinhovia hospita* L..
Biknong, see *Kleinhovia hospita* L..
Bilang-bilang, see *Sesuvium portulacastrum* (L.) L.
Biluan, see *Kleinhovia hospita* L..
Bingkit, see *Ryssopterys timoriensis* (DC.) Jussieu
Binoil-ure, see *Xylocarpus granatum* Koen.
Binong, see *Kleinhovia hospita* L..
Binusisi, see *Tristellateia australasiae* A. Rich.
Biosan, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Biris, see *Bruguiera cylindrica* (L.) Bl.
Bitanag, see *Kleinhovia hospita* L..
Bitnong, see *Kleinhovia hospita* L..
Biton, see *Olax imbricata* Roxb.
Bitoon, see *Barringtonia asiatica* (L.) Kurz
Biuis, see *Bruguiera cylindrica* (L.) Bl.
Bius, see *Bruguiera cylindrica* (L.) Bl.
Bokabok, see *Scaevola taccada* (Gaertn.) Roxb.
Bo-o, see *Ximenia americana* L.
Bosboron, see *Scaevola taccada* (Gaertn.) Roxb.
Botabon, see *Atuna racemosa* ssp. racemosa Rafin.
Bota-bota, see *Excoecaria agallocha* L.
Botga, see *Atuna racemosa ssp. racemosa* Rafin.
Boto, see *Scaevola taccada* (Gaertn.) Roxb.
Bual, see *Ximenia americana* L.
Bubutigan, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Bugtung-aha, see *Ryssopterys timoriensis* (DC.) Jussieu
Bulakan, see *Ipomoea gracilis* R. Br.
Bulali, see *Aegiceras corniculatum* (L.) Blanco
Bulali, see *Aegiceras floridum* Roemer & Schultes
Bulokbulok, see *Lumnitzera littorea* (Jack) Voigt.
Bulubadiang, see *Ceriops decandra* (Griff.) Ding Hou
Bunayon, see *Sonneratia alba* J.E. Smith

Buñgalon, see *Avicennia marina* (Forssk.) Vierh.
Buñgalon, see *Camptostemon philippinense* (Vidal) Becc.
Buñgalon, see *Sonneratia alba* J.E. Smith
Bungalon-puti, see *Avicennia alba* Blume
Bungalon-sahing, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Buñgalu, see *Avicennia marina* (Forssk.) Vierh.
Bungkuang, see *Scirpus grossus* Linné
Busain, see *Bruguiera cylindrica* (L.) Bl.
Busain, see *Bruguiera sexangula* (Lour.) Poir.
Busaing, see *Bruguiera gymnorrhiza* (L.) Lamk.
Busaing, see *Bruguiera sexangula* (Lour.) Poir.
Busiin, see *Bruguiera gymnorrhiza* (L.) Lamk.
Buta, see *Excoecaria agallocha* L.
Butabul, see *Atuna racemosa* ssp. *racemosa* Rafin.
Buta-buta, see *Excoecaria agallocha* L.
Buta-buti, see *Cerbera manghas* L.
Buto-buto, see *Cerbera manghas* L.
Butong, see *Pongamia pinnata* (L.) Pierre
Cabezas de negrito, see *Eleocharis dulcis* (Burm. f.) Henschel
Dalunu-babae, see *Lumnitzera littorea* (Jack) Voigt.
Dampalit, see *Sesuvium portulacastrum* (L.) L.
Dandulit, see *Camptostemon philippinense* (Vidal) Becc.
Dangliu, see *Hibiscus tiliaceus* L.
Danglog, see *Hibiscus tiliaceus* L.
Darah-darah, see *Croton heterocarpus* Müll. Arg.
Daraput, see *Quassia indica* (Gaertn.) Nooteboom
Dik-duk, see *Osbornia octodonta* F.v.Muell.
Dipodata, see *Excoecaria agallocha* L.
Dita, see *Cerbera manghas* L.
Ditadit, see *Ipomoea gracilis* R. Br.
Dulok-dulok, see *Lumnitzera littorea* (Jack) Voigt.
Dulok-dulok, see *Osbornia octodonta* F.v.Muell.
Dumanai, see *Aegiceras corniculatum* (L.) Blanco
Dumanai, see *Aegiceras floridum* Roemer & Schultes
Duñgas, see *Cerbera manghas* L.
Dungon, see *Heritiera littoralis* Dryand.
Dungon-late, see *Heritiera littoralis* Dryand.
Durugi, see *Cyperus compactus* Retz.
Gabi, see *Colocasia esculenta* (L.) Schott
Gapas-gapas, see *Camptostemon philippinense* (Vidal) Becc.
Getabon, see *Atuna racemosa* ssp. *racemosa* Rafin.
Giron, see *Cyperus compactus* Retz.
Gullum, see *Osbornia octodonta* F.v.Muell.
Gumaingat, see *Excoecaria agallocha* L.
Gumilum, see *Osbornia octodonta* F.v.Muell.
Habag, see *Hernandia ovigera* L.
Hagonoi, see *Wedelia biflora* (L.) DC.
Hamitanago, see *Kleinhovia hospita* L..
Hanbulali, see *Scyphiphora hydrophyllacea* Gaertn. f.

Hangalia, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Hangarai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Hanot, see *Hibiscus tiliaceus* L.
Hikau-hikauan, see *Sonneratia alba* J.E. Smith
Hikau-hikauan, see *Sonneratia caseolaris* (L.) Engl.
Himbabau, see *Excoecaria agallocha* L.
Iden, see *Thespesia populnea* (L.) Soland. ex Correa
Iiñgi, see *Excoecaria agallocha* L.
Ilukabban, see *Sonneratia alba* J.E. Smith
Ilukabban, see *Sonneratia caseolaris* (L.) Engl.
Ingual, see *Flagellaria indica* L.
Ipil, see *Intsia bijuga* (Colebr.) Kuntze
Ipil-lalao, see *Intsia bijuga* (Colebr.) Kuntze
Itil, see *Intsia bijuga* (Colebr.) Kuntze
Jojo saffranhout, see *Cassine viburnifolia* (Juss.) Ding Hou
Kabantigi, see *Pemphis acidula* J.R. & G. Forst.
Kachuchis, see *Avicennia alba* Blume
Kachuchis, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Kadel, see *Pongamia pinnata* (L.) Pierre
Kai-kai, see *Cyperus javanicus* Houtt.
Kalabayuan, see *Bruguiera sexangula* (Lour.) Poir.
Kalapinai, see *Bruguiera cylindrica* (L.) Bl.
Kalapini, see *Avicennia marina* (Forssk.) Vierh.
Kalapini, see *Lumnitzera littorea* (Jack) Voigt.
Kalapini-mañgitit, see *Avicennia marina* (Forssk.) Vierh.
Kalapini-maputi, see *Avicennia marina* (Forssk.) Vierh.
Kalimbabau, see *Xylocarpus granatum* Koen.
Kaliptan, see *Cerbera manghas* L.
Kalumpangin, see *Guettarda speciosa* Linn.
Kamigang, see *Ipomoea pes-capre* (L.) Sweet.
Kapagan, see *Guettarda speciosa* Linn.
Karifurong, see *Lumnitzera littorea* (Jack) Voigt.
Kasouai, see *Barringtonia racemosa* (L.) Spreng.
Katang-katang, see *Ipomoea pes-capre* (L.) Sweet.
Kayong, see *Glochidion littorale* Bl.
Kayongkong, see *Glochidion littorale* Bl.
Kindug-kindug, see *Aegiceras corniculatum* (L.) Blanco
Kindug-kindug, see *Aegiceras floridum* Roemer & Schultes
Kolimbauing, see *Xylocarpus granatum* Koen.
Kolinkogun, see *Hernandia ovigera* L.
Kolon-kogon, see *Hernandia ovigera* L.
Kolung-kolung, see *Hernandia ovigera* L.
Komon, see *Cynometra ramiflora* L.
Koron-koron, see *Hernandia ovigera* L.
Kulasi, see *Lumnitzera littorea* (Jack) Voigt.
Kulasi, see *Lumnitzera racemosa* Willd.
Kulasi, see *Osbornia octodonta* F.v.Muell.
Kulasi, see *Scyphiphora hydrophyllacea* Gaertn. f.
Kung-kung, see *Hernandia ovigera* L.

Kurunggut, see *Passiflora foetida* L.
Kutkut-timbalon, see *Barringtonia racemosa* (L.) Spreng.
Kuyapi, see *Avicennia marina* (Forssk.) Vierh.
Labnig, see *Intsia bijuga* (Colebr.) Kuntze
Labnot, see *Olax imbricata* Roxb.
Labui, see *Najas indica* (Willd.) Cham.
Lagairai, see *Ipomoea pes-capre* (L.) Sweet.
Lagasak, see *Bruguiera sexangula* (Lour.) Poir.
Lagbangan, see *Guettarda speciosa* Linn.
Lagoron, see *Wedelia biflora* (L.) DC.
Lagtang, see *Anamirta cocculus* L. Wight & Arn.
Lagun, see *Ryssopterys timoriensis* (DC.) Jussieu
Lagut-ut, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Lahunai, see *Wedelia biflora* (L.) DC.
Lambagu, see *Hibiscus tiliaceus* L.
Lambon, see *Guettarda speciosa* Linn.
Landing, see *Scyphiphora hydrophyllacea* Gaertn. f.
Langarai, see *Bruguiera cylindrica* (L.) Bl.
Langarai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Langari, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Langari, see *Bruguiera sexangula* (Lour.) Poir.
Laogo, see *Hibiscus tiliaceus* L.
Lapa-lapa, see *Camptostemon philippinense* (Vidal) Becc.
Lapuis, see *Kleinhovia hospita* L..
Laumus, see *Ryssopterys timoriensis* (DC.) Jussieu
Libato, see *Lumnitzera littorea* (Jack) Voigt.
Libatong-puti, see *Camptostemon philippinense* (Vidal) Becc.
Libatu-pula, see *Lumnitzera littorea* (Jack) Voigt.
Ligad, see *Pemphis acidula* J.R. & G. Forst.
Ligat, see *Pemphis acidula* J.R. & G. Forst.
Ligtang, see *Anamirta cocculus* L. Wight & Arn.
Linas, see *Lumnitzera littorea* (Jack) Voigt.
Linatog-anat, see *Quassia indica* (Gaertn.) Nooteboom
Liñgog, see *Avicennia marina* (Forssk.) Vierh.
Linton-gamai, see *Quassia indica* (Gaertn.) Nooteboom
Linu, see *Scaevola taccada* (Gaertn.) Roxb.
Lipata, see *Cerbera manghas* L.
Lipata, see *Excoecaria agallocha* L.
Lipatang-buhai, see *Excoecaria agallocha* L.
Lubanayong, see *Xylocarpus granatum* Koen.
Lukabban, see *Sonneratia alba* J.E. Smith
Lulasi, see *Avicennia marina* (Forssk.) Vierh.
Lupa pula, see *Rhizophora apiculata* Bl.
Mabaran, see *Avicennia marina* (Forssk.) Vierh.
Mabingdato, see *Quassia indica* (Gaertn.) Nooteboom
Magalai, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Magalolo, see *Lumnitzera littorea* (Jack) Voigt.
Magayao, see *Heritiera littoralis* Dryand.
Magit, see *Pongamia pinnata* (L.) Pierre

Magkanai, see *Cerbera manghas* L.
Magtangud, see *Bruguiera cylindrica* (L.) Bl.
Magtongod, see *Ceriops tagal* (Perr.) C.B. Rob.
Magtongog, see *Bruguiera cylindrica* (L.) Bl.
Malabagio, see *Olax imbricata* Roxb.
Malabutong, see *Olax imbricata* Roxb.
Malarayap, see *Atalantia monophylla* DC.
Malarungon, see *Heritiera littoralis* Dryand.
Malasaga, see *Derris scandens* (Aubl.) Pittier
Malasurut, see *Guettarda speciosa* Linn.
Malatangal, see *Ceriops decandra* (Griff.) Ding Hou
Malat-antañgan, see *Hernandia ovigera* L.
Malibago, see *Hibiscus tiliaceus* L.
Maligang, see *Osbornia octodonta* F.v.Muell.
Malubago, see *Hibiscus tiliaceus* L.
Manlok-balok, see *Pongamia pinnata* (L.) Pierre
Manotbonot, see *Osbornia octodonta* F.v.Muell.
Maoro, see *Lumnitzera littorea* (Jack) Voigt.
Maragomon, see *Brownlowia tersa* (L.) Kosterm.
Maraibai, see *Cerbera manghas* L.
Marakapas, see *Hibiscus tiliaceus* L.
Marakapas, see *Kleinhovia hospita* L..
Marobahai, see *Pongamia pinnata* (L.) Pierre
Maruk-baruk, see *Pongamia pinnata* (L.) Pierre
Matangal, see *Ceriops decandra* (Griff.) Ding Hou
Mayambago, see *Hibiscus tiliaceus* L.
Miapi, see *Avicennia marina* (Forssk.) Vierh.
Mosboron, see *Scaevola taccada* (Gaertn.) Roxb.
Mulato, see *Intsia bijuga* (Colebr.) Kuntze
Nala, see *Intsia bijuga* (Colebr.) Kuntze
Nigad, see *Glochidion littorale* Bl.
Nigi, see *Xylocarpus granatum* Koen.
Nigi-puti, see *Camptostemon philippinense* (Vidal) Becc.
Nilad, see *Scyphiphora hydrophyllacea* Gaertn. f.
Nilar, see *Scyphiphora hydrophyllacea* Gaertn. f.
Nipa, see *Nypa fruticans* Wurmb.
Nuling, see *Barringtonia racemosa* (L.) Spreng.
Odling, see *Cynometra ramiflora* L.
Padi-padi, see *Glochidion littorale* Bl.
Pagatpat baye, see *Sonneratia ovata* Back.
Pagatpat, see *Sonneratia alba* J.E. Smith
Pagatpat, see *Sonneratia caseolaris* (L.) Engl.
Pagatpat, see *Sonneratia ovata* Back.
Pagatpat-babae, see *Xylocarpus granatum* Koen.
Pagatput, see *Aegiceras corniculatum* (L.) Blanco
Pagatput, see *Aegiceras floridum* Roemer & Schultes
Pakat, see *Ceriops tagal* (Perr.) C.B. Rob.
Palagarium, see *Quassia indica* (Gaertn.) Nooteboom
Palagium, see *Quassia indica* (Gaertn.) Nooteboom

Palalan, see *Sonneratia alba* J.E. Smith
Palapat, see *Sonneratia caseolaris* (L.) Engl.
Palata, see *Sonneratia caseolaris* (L.) Engl.
Palatpat, see *Sonneratia alba* J.E. Smith
Paling, see *Barringtonia racemosa* (L.) Spreng.
Palingapoi, see *Heritiera littoralis* Dryand.
Palugapig, see *Heritiera littoralis* Dryand.
Palunag, see *Wedelia biflora* (L.) DC.
Palunai, see *Wedelia biflora* (L.) DC.
Palupa, see *Pemphis acidula* J.R. & G. Forst.
Pampas, see *Kleinhovia hospita* L..
Panabulon, see *Cerbera manghas* L.
Panampat, see *Kleinhovia hospita* L..
Pantigi, see *Pemphis acidula* J.R. & G. Forst.
Panting-panting, see *Lumnitzera littorea* (Jack) Voigt.
Pantog-lubo, see *Hernandia ovigera* L.
Papasil, see *Lumnitzera littorea* (Jack) Voigt.
Paronapin, see *Heritiera littoralis* Dryand.
Pata, see *Dolichandrone spathacea* (l.f.) K.Schum.
Patotan, see *Bruguiera gymnorrhiza* (L.) Lamk.
Patpat, see *Sonneratia alba* J.E. Smith
Paunapin, see *Heritiera littoralis* Dryand.
Payan, see *Sonneratia alba* J.E. Smith
Payar, see *Sonneratia caseolaris* (L.) Engl.
Pedada, see *Sonneratia caseolaris* (L.) Engl.
Petutan, see *Bruguiera gymnorrhiza* (L.) Lamk.
Piagao, see *Xylocarpus granatum* Koen.
Piagau, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Piapi, see *Avicennia alba* Blume
Piapi, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Piapi, see *Avicennia marina* (Forssk.) Vierh.
Piksik, see *Avicennia marina* (Forssk.) Vierh.
Pilapil, see *Aegiceras corniculatum* (L.) Blanco
Pilapil, see *Aegiceras floridum* Roemer & Schultes
Pilit, see *Pemphis acidula* J.R. & G. Forst.
Pindak, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Pipisig, see *Avicennia marina* (Forssk.) Vierh.
Pipisik, see *Aegiceras corniculatum* (L.) Blanco
Pipisik, see *Aegiceras floridum* Roemer & Schultes
Pipisik, see *Avicennia marina* (Forssk.) Vierh.
Pitogo, see *Cycas rumphii* Miq.
Ponoan, see *Quassia indica* (Gaertn.) Nooteboom
Potat, see *Barringtonia racemosa* (L.) Spreng.
Pototan lalaki, see *Bruguiera cylindrica* (L.) Bl.
Pototan, see *Bruguiera cylindrica* (L.) Bl.
Pototan, see *Bruguiera gymnorrhiza* (L.) Lamk.
Pototan, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Pototan, see *Bruguiera sexangula* (Lour.) Poir.
Pulit, see *Xylocarpus granatum* Koen.

Pundung, see *Avicennia alba* Blume
Pundung, see *Avicennia eucalyptifolia* Zipp. ex Moldenke
Putad, see *Barringtonia racemosa* (L.) Spreng.
Putat, see *Barringtonia racemosa* (L.) Spreng.
Pututan, see *Bruguiera cylindrica* (L.) Bl.
Pututan, see *Bruguiera gymnorrhiza* (L.) Lamk.
Pututan, see *Bruguiera sexangula* (Lour.) Poir.
Puyugan, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Ragindi, see *Hibiscus tiliaceus* L.
Ragiudiu, see *Scirpus grossus* Linné
Rungon, see *Ceriops tagal* (Perr.) C.B. Rob.
Sabasa, see *Scyphiphora hydrophyllacea* Gaertn. f.
Sagarai, see *Avicennia marina* (Forssk.) Vierh.
Sagasa, see *Bruguiera sexangula* (Lour.) Poir.
Sagasa, see *Glochidion littorale* Bl.
Sagasa, see *Lumnitzera littorea* (Jack) Voigt.
Sagasa, see *Osbornia octodonta* F.v.Muell.
Sagasa, see *Scyphiphora hydrophyllacea* Gaertn. f.
Sagasak, see *Bruguiera sexangula* (Lour.) Poir.
Saging-saging, see *Aegiceras corniculatum* (L.) Blanco
Saging-saging, see *Aegiceras floridum* Roemer & Schultes
Salasa, see *Lumnitzera littorea* (Jack) Voigt.
Salonai, see *Wedelia biflora* (L.) DC.
Sangkuyong, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Santing, see *Lumnitzera littorea* (Jack) Voigt.
Sapsap, see *Nypa fruticans* Wurmb.
Sasa, see *Nypa fruticans* Wurmb.
Sauang, see *Cycas rumphii* Miq.
Siak, see *Excoecaria agallocha* L.
Solasi, see *Lumnitzera racemosa* Willd.
Stanghas, see *Dolichandrone spathacea* (l.f.) K.Schum.
Sulasig, see *Aegiceras corniculatum* (L.) Blanco
Sulasig, see *Aegiceras floridum* Roemer & Schultes
Supsupun, see *Lumnitzera littorea* (Jack) Voigt.
Taag, see *Kleinhovia hospita* L..
Taal, see *Intsia bijuga* (Colebr.) Kuntze
Tabañgo, see *Glochidion littorale* Bl.
Tabao, see *Lumnitzera racemosa* Willd.
Tabataba, see *Hernandia ovigera* L.
Tabau, see *Lumnitzera littorea* (Jack) Voigt.
Tabau, see *Scyphiphora hydrophyllacea* Gaertn. f.
Tabau-tabau, see *Cerbera manghas* L.
Tabigi, see *Xylocarpus granatum* Koen.
Tabigi, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Tabon-tabon, see *Atuna racemosa ssp. racemosa* Rafin.
Tabon-tabon, see *Guettarda speciosa* Linn.
Tabug, see *Guettarda speciosa* Linn.
Tagasa, see *Bruguiera sexangula* (Lour.) Poir.
Tagasa, see *Ceriops tagal* (Perr.) C.B. Rob.

Tagnag, see *Kleinhovia hospita* L..
Tagsiak, see *Scyphiphora hydrophyllacea* Gaertn. f.
Talau, see *Lumnitzera littorea* (Jack) Voigt.
Talisai, see *Terminalia catappa* L.
Tamanag, see *Kleinhovia hospita* L..
Tambon, see *Guettarda speciosa* Linn.
Tambo-tambo, see *Xylocarpus granatum* Koen.
Tambubunot, see *Xylocarpus granatum* Koen.
Tan-ag, see *Kleinhovia hospita* L..
Tanak, see *Kleinhovia hospita* L..
Tangag, see *Kleinhovia hospita* L..
Tangal lalaki, see *Ceriops tagal* (Perr.) C.B. Rob.
Tangal, see *Ceriops decandra* (Griff.) Ding Hou
Tangal, see *Ceriops tagal* (Perr.) C.B. Rob.
Tangalan, see *Bruguiera cylindrica* (L.) Bl.
Tangal-babae, see *Bruguiera cylindrica* (L.) Bl.
Tañgas, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tanggal, see *Ceriops tagal* (Perr.) C.B. Rob.
Tangi, see *Xylocarpus granatum* Koen.
Tangile, see *Xylocarpus granatum* Koen.
Tangkuyon, see *Xylocarpus granatum* Koen.
Tanhas, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tarumpalit, see *Sesuvium portulacastrum* (L.) L.
Taualis, see *Osbornia octodonta* F.v.Muell.
Tayokon, see *Aegiceras corniculatum* (L.) Blanco
Tayokon, see *Aegiceras floridum* Roemer & Schultes
Tibigi, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Tigal, see *Intsia bijuga* (Colebr.) Kuntze
Tigasan, see *Ceriops tagal* (Perr.) C.B. Rob.
Tiker, see *Scirpus lacustris* L.
Timbabukis, see *Aegiceras corniculatum* (L.) Blanco
Timbabukis, see *Aegiceras floridum* Roemer & Schultes
Tindok-tindok, see *Aegiceras corniculatum* (L.) Blanco
Tindok-tindok, see *Aegiceras floridum* Roemer & Schultes
Tinduk-tindukan, see *Aegiceras corniculatum* (L.) Blanco
Tinduk-tindukan, see *Aegiceras floridum* Roemer & Schultes
Tiuayos, see *Osbornia octodonta* F.v.Muell.
Tiwi, see *Dolichandrone spathacea* (l.f.) K.Schum.
Toauis, see *Osbornia octodonta* F.v.Muell.
Toktok-kalau, see *Cerbera manghas* L.
Toloktok, see *Kleinhovia hospita* L..
Toston, see *Trianthema portulacastrum* L.
Tua, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tuauis, see *Osbornia octodonta* F.v.Muell.
Tuba-tuba, see *Barringtonia racemosa* (L.) Spreng.
Tuba-tuba, see *Thespesia populnea* (L.) Soland. ex Correa
Tugsiak, see *Scyphiphora hydrophyllacea* Gaertn. f.
Tui, see *Dolichandrone spathacea* (l.f.) K.Schum.
Tulatalisai, see *Guettarda speciosa* Linn.

Tungod, see *Ceriops tagal* (Perr.) C.B. Rob.
Tungug, see *Ceriops decandra* (Griff.) Ding Hou
Tungung, see *Ceriops decandra* (Griff.) Ding Hou
Twei, see *Dolichandrone spathacea* (l.f.) K.Schum.
Uaduat, see *Pemphis acidula* J.R. & G. Forst.
Uakatan Bakad, see *Rhizophora apiculata* Bl.
Uakatan, see *Rhizophora apiculata* Bl.
Ubet-ubet, see *Olax imbricata* Roxb.
Ula, see *Cynometra ramiflora* L.
Ulisuman, see *Trianthema portulacastrum* L.
Ulud , see *Cynometra ramiflora* L.
Unapong, see *Kleinhovia hospita* L..
Unas, see *Scyphiphora hydrophyllacea* Gaertn. f.
Valo, see *Thespesia populnea* (L.) Soland. ex Correa
Venagalang, see *Flagellaria indica* L.

Thai:
Chaa luead, see *Premna obtusifolia* R. Br.
Chaak, see *Nypa fruticans* Wurmb.
Chak, see *Nypa fruticans* Wurmb.
Cha khraam, see *Suaeda maritima* (L.) Dum.
Chik an, see *Barringtonia asiatica* (L.) Kurz
Chik le, see *Barringtonia asiatica* (L.) Kurz
Chik nam, see *Barringtonia asiatica* (L.) Kurz
Chik suan, see *Barringtonia racemosa* (L.) Spreng.
Chuk rohini, see *Dischidia rafflesiana* Wall.
Daeng nam, see *Aglaia cucullata* (Roxb.) Pellegrin
Eng-air, see *Melastoma saigonense* (Kuntze) Merr.
Faad daeng, see *Lumnitzera littorea* (Jack) Voigt.
Faad khao, see *Lumnitzera racemosa* Willd.
Fat, see *Lumnitzera littorea* (Jack) Voigt.
Fat, see *Lumnitzera racemosa* Willd.
Gluey mu lang, see *Dischidia rafflesiana* Wall.
Hu kwang, see *Terminalia catappa* L.
Ka fak ma muang, see *Dendrophthoe pentandra* (L.) Miq.
Ka fak mai ta tum, see *Viscum ovalifolium* D.C.
Ka thok rok, see *Passiflora foetida* L.
Khale thale, see *Dolichandrone spathacea* (l.f.) K.Schum.
Kha pho, see *Licuala spinosa* Wurmb.
Khlongkleng khon, see *Melastoma saigonense* (Kuntze) Merr.
Khluu, see *Pluchea indica* (L.) Less.
Klong-kleng, see *Melastoma saigonense* (Kuntze) Merr.
Kongkaang bai leu, see *Rhizophora apiculata* Bl.
Kongkaang bai yai, see *Rhizophora mucronata* Lamk.
Kongkang, see *Rhizophora apiculata* Bl.
Kongkang, see *Rhizophora mucronata* Lamk.
Kongkang, see *Rhizophora stylosa* Griff.
Krathing, see *Calophyllum inophyllum* L.
Kruai, see *Horsfieldia irya* (Gaertn.) Warb.

Laao cha own, see *Oncosperma tigillarium* (Jack.) Ridl.
Lambit thale, see *Diospyros ferrea* (Willd.) Bakh.
Lampaen, see *Sonneratia ovata* Back.
Lampaen thale, see *Sonneratia gri*ffithii Kurz.
Lam phaen, see *Sonneratia gri*ffithii Kurz.
Lam phu, see *Sonneratia caseolaris* (L.) Engl.
Lampoo, see *Sonneratia caseolaris* (L.) Engl.
Lampoo thale, see *Sonneratia alba* J.E. Smith
Lao cha on, see *Oncosperma tigillarium* (Jack.) Ridl.
Lumnok, see *Olax imbricata* Roxb.
Lumpho thale, see *Intsia bijuga* (Colebr.) Kuntze
Ma-kba-ling, see *Sindora siamensis* var. *maritima* (Pierre) K. & SS. Larsen
Maphrao-sida, see *Cycas rumphii* Miq.
Melabira, see *Fagraea crenulata* Maingay ex C.B. Clarke
Nam nong, see *Brownlowia tersa* (L.) Kosterm.
Ngaa sai, see *Planchonella obovata* (R.Br.) Pierre.
Ngon gai, see *Intsia bijuga* (Colebr.) Kuntze
Ngon kai, see *Heritiera littoralis* Dryand.
Ngonkai thale, see *Heritiera littoralis* Dryand.
Ngueak plaamo dok khao, see *Acanthus ilicifolius* L.
Ngueak plaamo dok muang, see *Acanthus ebracteatus* Vahl.
Nom pi kad, see *Hoya parasitica* (Roxb.) Wall. *ex* Wight
Nom tam lia, see *Hoya parasitica* (Roxb.) Wall. *ex* Wight
Non see, see *Peltophorum pterocarpum* (DC.) K. Heyne
Pangka hua sum dok khao, see *Bruguiera gymnorrhiza* (L.) Lamk
Pangka hua sum dok khao, see *Bruguiera sexangula* (Lour.) Poir.
Peng, see *Phoenix paludosa* Roxb.
Peng tha le, see *Phoenix paludosa* Roxb.
Pho thale, see *Hibiscus tiliaceus* L.
Pho thale, see *Thespesia populnea* (L.) Soland. ex Correa
Phueak, see *Colocasia esculenta* (L.) Schott
Phutsa-tha-le, see *Ximenia americana* L.
Po thale, see *Hibiscus tiliaceus* L.
Prasak, see *Bruguiera gymnorrhiza* (L.) Lamk.
Prasak nu, see *Bruguiera sexangula* (Lour.) Poir.
Prong, see *Ceriops decandra* (Griff.) Ding Hou
Prong, see *Ceriops tagal* (Perr.) C.B. Rob.
Prong, see *Cycas rumphii* Miq.
Prong daeng, see *Ceriops tagal* (Perr.) C.B. Rob.
Prong khao, see *Ceriops decandra* (Griff.) Ding Hou
Prong nuu, see *Acrostichum speciosum* Willd.
Prong thale, see *Acrostichum aureum* L.
Prong-tha-le, see *Cycas rumphii* Miq.
Raamyai, see *Ardisia elliptica* Thunberg
Rang ka thae, see *Kandelia candel* (L.) Druce
Rock, see *Corypha saribus* Lour.
Rok thale, see *Scaevola taccada* (Gaertn.) Roxb.
Sai yoi bai thuu, see *Ficus microcarpa* L.f.
Samae, see *Aegialitis rotundifolia* Roxb.

Samae, see *Avicennia marina* (Forssk.) Vierh.
Samae, see *Avicennia officinalis* L.
Samae dam, see *Avicennia officinalis* L.
Samae khao, see *Avicennia alba* Blume
Samae thale, see *Avicennia marina* (Forssk.) Vierh.
Samed, see *Melaleuca cajuputi* Roxb.
Sam ma ngaa, see *Clerodendrum inerme* (L.) Gaertn.
Samo thale, see *Excoecaria indica* (Willd.) Muell. Arg.
See ngam, see *Scyphiphora hydrophyllacea* Gaertn. f.
Son thale, see *Casuarina equisetifolia* L.
Taatum thale, see *Excoecaria agallocha* L.
Ta bun dam, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Ta bun khao, see *Xylocarpus granatum* Koen.
Tako suan, see *Diospyros malabarica* (Descr.) Kostel.
Tao rang, see *Caryota urens* L.
Tatum, see *Excoecaria agallocha* L.
Teenped saai, see *Cerbera manghas* L.
Teenped thale, see *Cerbera odollam* Gaertn.
Thian le, see *Pemphis acidula* J.R. & G. Forst.
Thua dam, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Thua khao, see *Bruguiera cylindrica* (L.) Bl.
Ti tang, see *Melastoma saigonense* (Kuntze) Merr.
Tin pet, see *Cerbera manghas* L.
Toei thale, see *Pandanus tectorius* Sol.
To sai, see *Allophylus cobbe* (L.) Raeusch.
Yee thale, see *Pongamia pinnata* (L.) Pierre
Yi thale, see Pongamia pinnata (L.) Pierre

Vietnamese:
Bâ'n dâng, see *Sonneratia alba* J.E. Smith
Bâ'n ô'i, see *Sonneratia ovata* Back.
Bâ'n sé, see *Sonneratia caseolaris* (L.) Engl.
Bàng nu'ó'c, see *Fagraea crenulata* Maingay ex C.B. Clarke
Bó'm Bà, see *Scolopia macrophylla* (W. & A.) Clos
Bô'n bô'n, see *Typha angustifolia* Linné
Bông nem, see *Erythrina orientalis* (L.) Murr.
Caay cui, see *Heritiera littoralis* Dryand.
Cây Lú'c, see *Pluchea pteropoda* Hemsl.
Chà là, see *Phoenix paludosa* Roxb.
Chiê'c vàng, see *Barringtonia asiatica* (L.) Kurz
Chiê'c, see *Barringtonia acutangula* (L.) Gaertn.
Choai, see *Stenochlaena palustris* (Burm. f.) Bedd.
Chóc gai ho'cói, see *Lasia spinosa* (L.) Thwaites
Chùm lé, see *Azima sarmentosa* (Bl.) B. & H.
Cô' cáy, see *Fimbristylis ferruginea* (L.) Vahl
Cô' cáy, see *Sporobolus virginicus* (L.) Kunth.
Cô' gà, see *Cynodon dactylon* (L.) Pers.
Có gâ'u bién, see *Cyperus stoloniferus* Retz.
Có sài hô', see *Pluchea pteropoda* Hemsl.

Cóc dó, see *Lumnitzera littorea* (Jack) Voigt.
Cóc kèn, see *Derris trifoliata* Lour
Cóc trâ'ng, see *Lumnitzera racemosa* Willd.
Cói, see *Cyperus malaccensis* Lamk.
Côi, see *Scyphiphora hydrophyllacea* Gaertn. f.
Co'm nguôi, see *Ardisia elliptica* Thunberg
Cui bien, see *Heritiera littoralis* Dryand.
Cui, see *Heritiera littoralis* Dryand.
Dà quánh, see *Ceriops decandra* (Griff.) Ding Hou
Dà vôi, see *Ceriops tagal* (Perr.) C.B. Rob.
Da-ba, see *Ficus curtipes* Corner
Dái ngu'a nu'ó'c, see *Aglaia cucullata* (Roxb.) Pellegrin
Dây cám, see *Sarcolobus globosus* Wall.
Dây chùm gó'i, see *Dendrophthoe pentandra* (L.) Miq.
Dây chùm gong, see *Clerodendrum inerme* (L.) Gaertn.
Dây ghi, see *Viscum ovalifolium* DC.
Dây Mõ qua, see *Dischidia rafflesiana* Wall.
Dây môc tiê'n, see *Dischidia nummularia* R.Br.
Dây Mu, see *Finlaysonia obovata* Wall.
Dây mu, see *Gymnanthera oblonga* (Burm. f) P.S. Green
Du'ong dâù kêt ho'p, see *Olax imbricata* Roxb.
Dú'a nu'ó'c, see *Nypa fruticans* Wurmb.
Du'ng, see *Rhizophora mucronata* Lamk.
Du'ng, see *Rhizophora stylosa* Griff.
Du'ó'c, see *Rhizophora apiculata* Bl.
Giá, see *Excoecaria agallocha* L.
Gõ nu'ó'c, see *Intsia bijuga* (Colebr.) Kuntze
Gú'a, see *Ficus microcarpa* L.f.
Ho dâu, see *Casuarina equisetifolia* L.
Kè, see *Corypha saribus* Lour.
Ký nam, see *Hydnophytum formicarum* Jack
Lá lua, see *Cynometra ramiflora* L.
Lac tiên, see *Passiflora foetida* L.
Lác, see *Cyperus malaccensis* Lamk.
Lú'c cây, see *Pluchea indica* (L.) Less
Mái dâ'm, see *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott
Mâ'm den, see *Avicennia officinalis* L.
Mâ'm lu'o'i dô'ng, see *Avicennia alba* Blume
Mâ'm ô'i, see *Avicennia marina* (Forssk.) Vierh.
Mâ'm quân, see *Avicennia lanata* Ridley
Mây nu'ó'c, see *Flagellaria indica* L.
Môn nu'ó'c, see *Colocasia esculenta* (L.) Schott
Mù u, see *Calophyllum inophyllum* L.
Mua, see *Melastoma malabathricum* var. malabathricum L.
Múi, see *Glochidion littorale* Bl.
Muoi bien, see *Suaeda maritima* (L.) Dum.
Muóp xác vàng, see *Cerbera odollam* Gaertn.
Nàgg ho' ráy, see *Crinum asiaticum* L.
Nâng bôp, see *Eleocharis dulcis* (Burm. f.) Henschel

Nhan lô'ng, see *Passiflora foetida* L.
Nhum, see *Oncosperma tigillarium* (Jack.) Ridl.
Ô rô gai, see *Acanthus ilicifolius* L .
Ô rô, see *Acanthus ebracteatus* Vahl.
Phi lao, see *Casuarina equisetifolia* L.
Quao nu'ó'c, see *Dolichandrone spathacea* (l.f.) K.Schum.
Ráng, see *Acrostichum aureum* Linné
Rau heo, see *Sesuvium portulacastrum* (L.) L.
Rau mui, see *Wedelia biflora* (L.) DC.
Rau muô'ng biê' n, see *Ipomoea pes-capre* (L.) Sweet.
Sây, see *Phragmites karka* (Retz.) Trin. ex Steud.
Su ô'i, see *Xylocarpus granatum* Koen.
Su sú'ng, see *Xylocarpus moluccensis* (Lamk) M. Roem.
Sú, see *Aegiceras corniculatum* (L.) Blancor
Tân môc lang see *Cordia cochinchinensis* Gagnep.
Thien tue, see *Cycas rumphii* Miq.
Tim lang, see *Barringtonia racemosa* (L.) Spreng.
Tra bô' dê', see *Thespesia populnea* (L.) Soland. ex Correa
Tra nhó't, see *Hibiscus tiliaceus* L.
Tràm, see *Melaleuca cajuputi* Roxb.
Trang, see *Kandelia candel* (L.) Druce
Vet dù bông dó, see *Bruguiera gymnorrhiza* (L.) Lamk.
Vet dù, see *Bruguiera sexangula* (Lour.) Poir.
Vet tách, see *Bruguiera parviflora* (Roxb.) W.& A. ex Griff.
Vet thâng, see *Bruguiera cylindrica* (L.) Bl.