

Rimba Raya Plant Summary

January 2009

Plant species diversity in the project area is not doubt extremely high, and many elements of the flora are rare, threatened or protected species. Yet, comprehensive, systematic floristic surveys have not been conducted in either nearby Tanung Puting National Park (TPNP) or the project area. For this reason, there was limited primary data available for direct reference to assemble and evaluate a list of plant species present in the project area. A semi-structured botanical survey was conducted in the project area, however, by a group of researchers from the Agricultural Institute of Bogor (Santosa et al. 2008), which combined limited field identification with translation of local names into latin binomials. These floristic data, which should be treated as preliminary, were in turn supplemented based on (i) likely vegetation types of the project area (see Description of Vegetation Types in a separate document); (ii) species associated with these vegetation types on Kalimantan and considered potentially present in the project area, based on Daemeter's field botanical experience on the island and reference to secondary literature (Ashton 1982; Anderson 1972; Mansur 2002; Ng & Ibrahim 2001); and (iii) reference to plant records from other sources deemed reliable. The resulting list (see attached) is no doubt far from complete, but is a conservative, sound compilation of reliable data upon which to build.

Throughout the exercise, emphasis was placed on woody plants. This overlooks most orchid¹ and carnivorous plant diversity, both of which are likely to be extremely high in the project area given the predominance of peat swamp and kerangas vegetation types. No attempt has been made to indicate species confirmed or potentially present in the different vegetation types of the project area (i.e., peat, kerangas, freshwater swamp, riparian forest, mixed dipterocarp forest), pending field verification of these types and their condition.

To maximize conservation relevance of this partial list, effort was concentrated on evaluating records and data for the Dipterocarpaceae and other plant families (e.g., Sapotaceae) known to predominate the IUCN list of threatened plants in Indonesia, as well as the Government of Indonesia list of protected species.

Among the 180 plant taxa listed (mostly woody plants), 45 are considered threatened by IUCN. Of these, 25 species are Critically Endangered (CR), 14 are Endangered (EN) and six are Vulnerable (VU). CR species are heavily dominated by canopy trees in the genus *Shorea* and to a lesser extent *Dipterocarpus*, both of which are overexploited for timber production throughout their range, and have suffered extensive habitat loss due to conversion to non-forest uses. The medium size canopy tree *Shorea balangeran*, is a common tree in nearby TPNP and is considered among the most highly threatened dipterocarps on Borneo, due to severe over-harvesting throughout its range, where it naturally formed high density stands that made it a target of commercial logging operations in the past. The species is likely present in the project area as well.

¹ For example, it is claimed (<http://www.indonesia-tourism.com/news/2007/02/08/tanjung-puting-national-park-is-one-of-the-natural-wonders-of-the-world/>) that 200 species of orchid are confirmed present in TPNP, but this claim could not be verified with species lists available in published or unpublished 'gray' literature. Orchids are therefore absent from the plant list.

At least 15 species potentially present in the project area are protected by GOI.

These include medium to tall timber tree species restricted to peat swamp and wet kerangas forest, such as *Palaquium leiocarpum* and *Ganua motleyana* in the Sapotaceae, and *Dyera costulata* (jelutung) in the Apocynaceae, as well as the ground dwelling pitcher plant *Nepenthes ampullaria*. Also considered potentially present in limited areas of mixed dipterocarp forest in the project area, especially along flood plains of slow moving rivers, is Bornean Ironwood (*Eusideroxylon zwageri*), as well as the illipe nut tree *Shorea seminis*.

Literature Cited (or referenced in the associated Plant List)

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Ashton, P.S. 1982. Dipterocarpaceae. Flora Malesiana. Series 1, Volume 9.

Mansur, M. 2002. Nepenthes: Kantong semar yang unik. Penebar Swadaya, Depok, Indonesia.

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Noerdjito, M. and I. Maryanto. 2007. Jenis-jenis hayati yang dilindungi perundang-undangan Indonesia. LIPI Press, Cibinong, Indonesia.

Santosa, Y., A.P. Kartono and A. Muin. 2008. Pendugaan potensi dan studi keanekaragaman jenis vegetasi di calon lokasi pelepasan-liaran orang utan di Kabupaten Seruyan, Propinsi Kalimantan Tengah. Institute Pertanian Bogor, Bogor, Indonesia.

Genus	Species	Family	IUCN status	IUCN notes	Indon. Law	Notes	Source
Camptosperma	auriculatum	Anacardiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Camptosperma	coriaceum	Anacardiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Gluta	renghas	Anacardiaceae					IPB 2008
Mangifera	havilandii	Anacardiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Mangifera	spp.	Anacardiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Swintonia	glauca	Anacardiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Goniothalamus	spp.	Annonaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Mezzettia	leptopoda	Annonaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Polyalthia	sclerophylla	Annonaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Xylopia	coriifolia	Annonaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Xylopia	malayana	Annonaceae					IPB 2008
Alstonia	spatulata	Apocynaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Alstonia	spp.	Apocynaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Dyera	costulata	Apocynaceae			P	Trees <60	Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Agathis	borneensis	Araucariaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Canarium	spp.	Burseraceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Dacryodes	costata	Burseraceae					IPB 2008
Dacryodes	incurvata	Burseraceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Dacryodes	rostrata	Burseraceae					IPB 2008
Santiria	apiculata	Burseraceae					IPB 2008
Santiria	leaevigata	Burseraceae					IPB 2008
Santiria	rubiginosa	Burseraceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Gymnostoma	nobile	Casuarinaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Bhesa	paniculata	Celestraceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Lophopetalum	multinervium	Celestraceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Calophyllum	ferrugineum	Clusiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Calophyllum	pulcherrinum	Clusiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Calophyllum	sclerophyllum	Clusiaceae					IPB 2008
Cratoxylum	arborescens	Clusiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Cratoxylum	glaucum	Clusiaceae					IPB 2008
Garcinia	dioica	Clusiaceae					IPB 2008
Garcinia	dulcis	Clusiaceae					IPB 2008
Garcinia	spp	Clusiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Warmia	excelsa	Dilleniaceae					IPB 2008
Anisoptera	grossivenia	Dipterocarpaceae	EN	A1cd+2cd			Ashton 1982; Paoli, pers obs;
Anisoptera	marginata	Dipterocarpaceae	EN	A1cd+2cd			Ashton 1982; Paoli, pers obs;
Cotylelobium	burckii	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Cotylelobium	lanceolatum	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Cotylelobium	melanoxylon	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Dipterocarpus	acutangulus	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Dipterocarpus	borneensis	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Dipterocarpus	borneensis	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Dipterocarpus	coriaceus	Dipterocarpaceae	CR	A1cd+2cd, B1+2c	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	crinitus	Dipterocarpaceae	EN	A1cd+2cd	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	elongatus	Dipterocarpaceae	CR	A1cd+2cd, B1+2c	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	eurhynchus	Dipterocarpaceae	CR	A1cd+2cd, B1+2c	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	gracilis	Dipterocarpaceae	CR	A1cd+2cd	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	humeratus	Dipterocarpaceae			P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	kunstleri	Dipterocarpaceae	CR	A1cd+2cd	P	All Diptero	Ashton 1982; Paoli, pers obs;

Dipterocarpus	spp.	Dipterocarpaceae			P	All Diptero	Ashton 1982; Paoli, pers obs;
Dipterocarpus	sublamellatus	Dipterocarpaceae	EN	A1cd+2cd	P	All Diptero	Ashton 1982; Paoli, pers obs;
Dryobalanops	beccarii	Dipterocarpaceae	EN	A1cd+2cd			Ashton 1982; Paoli, pers obs;
Dryobalanops	fusca	Dipterocarpaceae	CR	A1cd+2cd, B1+2c, C1, D			Ashton 1982; Paoli, pers obs;
Dryobalanops	rappa	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Hopea	beccariana	Dipterocarpaceae	CR	A1cd+2cd			Ashton 1982; Paoli, pers obs;
Hopea	dryobalanooides	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Hopea	griffithii	Dipterocarpaceae	VU	A1cd+2cd			Ashton 1982; Paoli, pers obs;
Hopea	kerangasensis	Dipterocarpaceae	CR				Ashton 1982; Paoli, pers obs;
Hopea	sangal	Dipterocarpaceae	CR	A1cd, B1+2c, C1, D			Ashton 1982; Paoli, pers obs;
Hopea	semicuneata	Dipterocarpaceae	CR	A1cd, B1+2c			Ashton 1982; Paoli, pers obs;
Shorea	balangeran	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	coriacea	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	exelliptica	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	faguetiana	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	gibbosa	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	guiso	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	induplicata	Dipterocarpaceae	CR	A1cd, B1+2bde, C2a			Ashton 1982; Paoli, pers obs;
Shorea	johorensis	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	lamellata	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	leprosula	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	longiflora	Dipterocarpaceae	CR	A1cd, C2a			Ashton 1982; Paoli, pers obs;
Shorea	longisperma	Dipterocarpaceae	CR	A1cd, C2a			Ashton 1982; Paoli, pers obs;
Shorea	obscura	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	ovalis	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	ovata	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	palembanica	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	parvifolia	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	parvistipulata ssp. alt	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	parvistipulata ssp. pa	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	pauciflora	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	platycarpa	Dipterocarpaceae	CR	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	quadrinervis	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	retusa	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	ricehetia	Dipterocarpaceae	CR	A1cd, C2a			Ashton 1982; Paoli, pers obs;
Shorea	rugosa	Dipterocarpaceae	CR	A1cd, C2a			Ashton 1982; Paoli, pers obs;
Shorea	sagittata	Dipterocarpaceae	CR	A1cd, C2a			Ashton 1982; Paoli, pers obs;
Shorea	scabrida	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Shorea	seminis	Dipterocarpaceae	CR	A1cd	P		Ashton 1982; Paoli, pers obs;
Shorea	teysmaniana	Dipterocarpaceae	En				Ashton 1982; Paoli, pers obs;
Shorea	teysmanniana	Dipterocarpaceae	EN	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	uliginosa	Dipterocarpaceae	VU	A1cd			Ashton 1982; Paoli, pers obs;
Shorea	uliginosa	Dipterocarpaceae					Ashton 1982; Paoli, pers obs;
Vatica	rassak	Dipterocarpaceae	VU	A1cd			IPB 2008
Diospyros	confertifolia	Ebenaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Diospyros	maingayi	Ebenaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Diospyros	pseudomalabarica	Ebenaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Elaeocarpus	spp.	Elaeocarpaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Elaeocarpus	valetonii	Elaeocarpaceae					IPB 2008
Baccaurea	spp.	Euphorbiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Baccaurea	sumatrana	Euphorbiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Blumeodendron	tokbrai	Euphorbiaceae					Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;

Macaranga	caladiifolia	Euphorbiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Macaranga	maingayi	Euphorbiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Neoscortechinia	forbesii	Euphorbiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Koompassia	malaccensis	Fabaceae	LR/cd (1994)		IPB 2008
Castanopsis	spp.	Fagaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Lithocarpus	pusillus	Fagaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Quercus	bennettii	Fagaceae			IPB 2008
Stemonurus	secundiflorus	Icacinaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Alseodaphne	insignis	Lauraceae			IPB 2008
Cryptocarya	rugulosa	Lauraceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Eusideroxylon	zwageri	Lauraceae		P	No felling k other
Litsea	turfosa	Lauraceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Barringtonia	reticulata	Lecythidaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Durio	carinatus	Malvaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Durio	oxleyanus	Malvaceae			IPB 2008
Durio	spp.	Malvaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Aglaia	rubiginosa	Meliaceae	LR/nt (1994)		IPB 2008
Chisocheton	amabilis	Meliaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Sandoricum	beccarianum	Meliaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Artocarpus	kemando	Moraceae			IPB 2008
Artocarpus	spp.	Moraceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Ficus	variegata	Moraceae			IPB 2008
Parartocarpus	venenosus	Moraceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Knema	intermedia	Myristicaceae	LR/nt (1994)		Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Myristica	lowiana	Myristicaceae	LR/nt (1994)		Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Rhodomyrtus	tomentosus	Myrtaceae			Paoli, pers. comm.
Syzygium	cuprea	Myrtaceae			IPB 2008
Syzygium	leucoxylon	Myrtaceae			IPB 2008
Syzygium	spp.	Myrtaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Syzygium	tawaense	Myrtaceae			IPB 2008
Syzygium	zeylanica	Myrtaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Tristaniopsis	grandifolia	Myrtaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Tristaniopsis	maingayi	Myrtaceae			IPB 2008
Tristaniopsis	obovata	Myrtaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Tristaniopsis	whiteana	Myrtaceae			Paoli, pers. comm.
Nepenthes	albomarginata	Nepentheaceae			Mansur 2002
Nepenthes	ampullaria	Nepentheaceae		P	Strictly pro Mansur 2002
Nepenthes	bicalcarata	Nepentheaceae	VU		Mansur 2002
Nepenthes	gracilis	Nepentheaceae			Mansur 2002
Nepenthes	mirabilis	Nepentheaceae			Mansur 2002
Nepenthes	refflesiana	Nepentheaceae			Mansur 2002
Nepenthes	reinwardtiana	Nepentheaceae			Mansur 2002
Nepenthes	veitchii	Nepentheaceae			Mansur 2002
Coelogyne	pandurata	Orchidaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
spp		Orchidaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Pandanus	spp.	Pandanaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Dacrydium	pectinatum	Podocarpaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Dacrydium	pectinatum	Podocarpaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Nageia	walichiana	Podocarpaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Carallia	brachiata	Rhizophoraceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Combretocarpus	rotundatus	Rhizophoraceae	VU	A1cd (1994)	IPB 2008
Parastemon	spicatus	Rosaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;

Hydnophytum	spp.	Rubiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Mussaendopsis	beccariana	Rubiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Myrmecodia	spp.	Rubiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Nephelium	eripetalum	Sapindaceae			IPB 2008
Nephelium	spp.	Sapindaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Chrysophyllum	spp.	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Ganua	motleyana	Sapotceae	P	No felling t	IPB 2008
Ganua	spp.	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Madhuca	motleyana	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Palaquium	cochlearifolium	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Palaquium	leiocarpum	Sapotceae	P	Individuals	Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Palaquium	pseudorostratum	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Palaquium	rostratum	Sapotceae			IPB 2008
Palaquium	spp.	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Payena	spp.	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Pouteria	spp.	Sapotceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Scaphium	macropodum	Sterculiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Sterculia	bicolor	Sterculiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Sterculia	rhoidifolia	Sterculiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Sterculia	rubiginosa	Sterculiaceae			IPB 2008
Sterculia	rufa	Sterculiaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Symplocus	celastrifolia	Symplocaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Tetramerista	glabra	Tetrameristacaceae			Paoli, pers comm;
Schima	walichii	Theaceae			IPB 2008
Ternstroemia	grandis	Theaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Gonystylus	bancanus	Thymeleaceae	VU	A1cd	Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;
Gonystylus	spp.	Thymeleaceae			Paoli, pers obs; Anderson 1972; Ng & Ibrahim 2001;