

FLORA DIVERSITY OF SUNGAI TERIS, KRAU WILDLIFE RESERVE, PAHANG, MALAYSIA

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ABSTRACT

Pristine area around Sungai Teris within Krau Wildlife Reserve, Pahang was surveyed between 20 and 26 Jun 2013 with the objectives to i) study and understand the reservepristine ecosystem,ii) document various existing biodiversity components for future management and conservation, and iii) collected genetic plant resources. Sampling were made representing 3 major plant groups namely gymnosperms, and dicotyledons (angiosperm & monocotyledon). For gymnosperms, only 1 species was recorded which is *Gnetum tenuifolium*. A total of 41 families of angiosperm were inventorized with the most dominant family is Euphorbiaceae with 15 genera and 26 species, followed by Leguminosae with 11 genera and 11 species, Annonaceae with 9 genera and 14 species and the other families with only 1 or 2 genera such as Anacardiaceae, Anysophyllaceae, Apocynaceae, Araliaceae, Aralidiaceae, Bombacaceae, Burseraceae, Ceropiaceae, Chloranthaceae, Cannaceae, Dilleniaceae, Dipterocarpaceae, Ebenaceae, Elaeocarpaceae, Flacourtiaceae, Gesneriaceae, Guttiferae, Iracinaceae, Lauraceae, Lechytiaceae, Loganiaceae, Lythraceae, Meliaceae, Moraceae, Myristicaceae, Mrysinaceae, Olacaceae, Pandanaceae, Piperaceae, Rubiaceae, Rutaceae, Sapindaceae, Simaroubaceae, Sterculiaceae, Tiliaceae, Verbenaceae, Violaceae and Vitaceae. The other families inventorized are Araceae, Cyperaceae, Hypoxidaceae, Commelinaceae, Covallariaceae, Costaceae, Dracaenaceae, Graminae, Hanguanaceae, Hypoxidaceae, Marantaceae, Orchidaceae, Palmae, Pandanaceae, Smilaceae, Taccaceae, and Zingiberaceae. Some species bear fruits during this inventory trip such as *Baccaurea parvifolia*, and *Nephelium* sp. The plants in this area are considered diverse and further inventory is suggested in the near future.

Keywords: Flora diversity, Sungai Teris, Krau Wildlife Reserve, Malaysia

INTRODUCTION

Aims and methods of the study

The main aims of this study were to conduct a plant inventory and to carry out qualitative assessment of the flora diversity and composition through general field collections at different times of year, as well as to include records of earlier herbarium collections of Krau Wildlife Reserve (KWR) plants and to highlight the conservation value of this habitat and the plants it harbours. This will provide baseline data on the flora of KWR, specifically on Sungai Teris that can serve as a useful tool for the authorities in-charge of protecting the site to monitor changes pattern to the flora.

METHODOLOGY

Field surveys

Collections were made of fertile vascular plants for herbarium specimens, but also of sterile specimens of major timber trees as vouchers. Specimens are deposited in the Malaysian Agricultural Research and Development Institute Herbarium and are recorded in the Agrobiodiversity Information System (AgroBIS) database for easy access. Plant identification and description were referred to Corner, 1952; Stone 1977; Turner 1995; Latiff *et al.* 1999, & Soepadmo *et al.* 1995. During the field survey, six (6) trails were selected and botanised. They were Trail A, B, C, D, E and F. Plant listing and collection were also made along the riverine area in Sungai Teris. Rapid assessment technique was used during the survey to record the species composition and diversity. Standard collecting materials and methods and note taking were used (Bridson and Forman, 1992). Herbarium specimens were collected for plants bearing fertile materials, while vouchers were collected for plants that were not flowering or fruiting. Floristic notes and habitat types were also recorded. All voucher and herbarium collections were lodged at the MARDI herbarium. The checklist contained vouchers, herbarium records, and sighted records (these are species which were sighted in the sites but were not collected and do not have a voucher). Sterile materials known only at the family level are not included in the checklist, while taxa known only to the genus level e.g *Garcinia*, *Mangifera* and *Durio* are included.

RESULTS AND DISCUSSION

A total of 210 species were observed from all trails in Sungai Teris, Krau Wildlife Reserve Pahang Darul Makmur reflecting a density of 528 trees/trails. Tree communities in the study were dominated by medium-high sized trees, whereby the highest number of individuals with a total of 282 trees was within diameter class of 5.0- 14.9 cm. Table 2 shows the number of individuals obviously decreasing as the DBH class size increase. This area was dominated by *Dipterocarpus* spp. (Dipterocarpaceae) with DBH of 55.7 cm. Taxonomic composition of the trees reveals a total of 210 species and 61 genera from 61 families. The Leguminosae is the largest families represented by 14 species from 12 genera. This was followed by the Euphorbiaceae and Rubiaceae with the both families represented by 11 and 8 species respectively. It is interesting to note that there are 30 families present in the plots that are represented by only one species – Anacardiaceae, Anysophyllaceae, Apocynaceae, Araliaceae, Araliaceae, Bombacaceae, Burseraceae, Ceropiaceae, Chloranthaceae, Cannaceae, Dilleniaceae, Dipterocarpaceae, Ebenaceae, Elaeocarpaceae, Flacourtiaceae, Gesneriaceae, Guttiferae, Iraciniaceae, Lauraceae, Lechytidaceae, Loganiaceae, Lythraceae, Meliaceae, Moraceae, Myristicaceae, Mrysinaceae, Olacaceae, Pandanaceae, Piperaceae, Rubiaceae, Rutaceae, Sapindaceae, Simaroubaceae, Sterculiaceae, Tiliaceae, Verbenaceae, Violaceae and Vitaceae. From this survey, there were 26 species of rare and wild edible fruit species that are important for the food security and food sources for the wild community here. There are *Gnetum tenuifolium*, *Elaeiodoxa conferta*, *Bouea macrophylla*, *Bouea oppositifolia*, *Mangifera* sp., *Goniothalamus macrophyllus*, *Durio lowianus*, *Baccaurea parvifolia*, *Barringtonia racemosa*, *Garcinia atroviridis*, *Garcinia bancana*, *Garcinia opaca*, *Garcinia nervosa*, *Barringtonia fusiformis*, *Barringtonia macrocarpa*, *Barringtonia macrostachys*, *Barringtonia scortechnii*, *Parkia speciosa*, *Lansium domesticum*, *Sandoricum koetjape*, *Artocarpus elasticus*, *Artocarpus lanceifolius*, *Artocarpus lowii*, *Artocarpus scortechnii*, *Pometia pinnata* and *Xerospermum noronhianum*. Gnetaceae is represented by only one species, *Gnetum tenuifolium*. For Araceae, 8 genera were observed, namely *Aglaonema*, *Alocasia*, *Amorphophallus*, *Anadendrum*, *Epipromnopsis*, *Homalomena*, *Pothos* and *Raphidora*. Commelinaceae represented by 2 genera – *Amischotolype* and *Pollia* while Convallariaceae only represented by *Peliosanthes teta*. *Costaceae* was represented by only one genus – namely *Costus* and two species. On the other hand,

Cyperaceae represented by two genera – *Cyperus* and *Mapania*. The most dominant family in this area is *Euphorbiaceae* with 15 genera – *Agrostitachys*, *Antidesma*, *Aporosa*, *Baccaurea*, *Blumeodendron*, *Bridelia*, *Claoxylon*, *Croton*, *Endospermum*, *Entada*, *Macaranga*, *Mallotus*, *Neoscorthehnii*, *Pimelodendron* and *Ptychopyxis*. This is followed by *Leguminosae*, represented by eleven genera namely *Bauhinia*, *Adenanthera*, *Callerya*, *Cynometra*, *Dialium*, *Koompassia*, *Milletia*, *Mucuna*, *Parkia*, *Saracca* and *Sindora*.

CONCLUSIONS

There were many wild and rare edible fruit tree species in Krau Wildlife Reserve. Since our main aim was to survey, document and collect seeds for conservation purposes, the correct timing of the expedition was very critical. Although many species were found in the wildlife reserve, none of the species was flowering and fruiting, except for *Baccaurea* and *Xerospermum*, therefore no seeds could be collected for our rare fruits genebank conservation program.

ACKNOWLEDGEMENTS

The authors wish to thank the Director of Strategic Resources Research Centre, and The Deputy Director of Bioresource Management and Utilisation Programme, SR01, Strategic Resources Research Center for their permission to join the expedition. We also wish to thank Miss Tan Poi Ean and PERHILITAN Malaysia for their hospitality and help during our expedition at Royal Belum Forest Reserve

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Family	Scientific name	Local name
Gnetaceae	<i>Gnetum tenuifolium</i>	Melinjau/belinjau liar
Araceae	<i>Aglaonema nitidum</i>	sumpah bulan
	<i>Aglaonema simplex</i>	
	<i>Alocasia denudata</i>	keladi candik
	<i>Amorphophallus paenofolius</i>	keladi lekit
	<i>Anadendrum marginatum</i>	
	<i>Epipromnopsis media</i>	
	<i>Homalomena griffithii</i>	kelemoyang
	<i>Homalomena propinqua</i>	kelemoyang
	<i>Pothos latifolius</i>	
	<i>Raphidophora lobbii</i>	
Commelinaceae	<i>Amischotolype griffithii</i>	tebu kera
	<i>Amischotolype molissima</i>	
	<i>Pollia sorzogonensis</i>	
Convallariaceae	<i>Peliosanthes teta</i>	
Costaceae	<i>Costus globosus</i>	setawar hutan
	<i>Costus speciosus</i>	Setawar hutan
Cyperaceae	<i>Cyperus</i> sp.	
	<i>Mapania bancana</i>	senayan batu
	<i>Mapania cuspidata</i>	serapat bukit
	<i>Mapania palustris</i>	
Dracaenaceae	<i>Dracaena elliptica</i>	pandan serani
Graminae	<i>Bambusa</i> sp.	
	<i>Centotheca lappacea</i>	
	<i>Scrotochloa ucceolata</i>	tampuk relang, sayung tikus
Hanguanaceae	<i>Hanguana malayana</i>	bakung hutan
Hypoxidaceae	<i>Molineria latifolia</i>	Lemba
Marantaceae	<i>Maranta</i> sp.	
	<i>Phrynium pubinerve</i>	Lerek
Orchidaceae	<i>Apostasia nuda</i>	
	<i>Calanthe</i> sp.	
	<i>Dendrobium crumenatum</i>	
	<i>Dendrobium</i> sp.	

Palmae	<i>Calamus</i> sp	Rotan
	<i>Elaeiodoxa conferta</i>	Kelubi
	<i>Eugeissonia tristis</i>	bertam
	<i>Iguanura geonomaeformis</i>	
	<i>Iguanura wallichiana</i>	
	<i>Korthalsia</i> sp.	
	<i>Licuala</i> sp	Palas
	<i>Oncosperma horridum</i>	Bayas
	<i>Pinanga disticha</i>	
	<i>Salacca</i> sp.	
Pandanaceae	<i>Pandanus</i> sp.	
Smilacaceae	<i>Smilax megacarpa</i>	akar rebana, kelona
Taccaeeae	<i>Tacca integrifolia</i>	belimbing tanah, janggut baung
Zingiberaceae	<i>Alpinia</i> sp.	Tepus
	<i>Etlingera</i> sp.	
	<i>Globba patens</i>	meroyan berok
	<i>Geostachys</i> sp.	
Anacardiaceae	<i>Bouea macrophylla</i>	kundang
	<i>Bouea oppositifolia</i>	Remia
	<i>Camptosperma auriculatum</i>	terentang daun besar
	<i>Dracontomelon dao</i>	kedondong sengkung
	<i>Mangifera</i> sp.	
	<i>Melanochyla angustifolia</i>	rengas padi
Anisophylleaceae	<i>Semecarpus curtisii</i>	rengas ayam
	<i>Anisophyllea disticha</i>	kayu pacat

Annonaceae	<i>Anaxagorea javanica</i>	kekapor
	<i>Artabotrys crassifolia</i>	
	<i>Cyatocalyz pruniferus</i>	Antoi
	<i>Goniothalamus macrophyllus</i>	selayak hitam)
	<i>Orophea enterocarpa</i>	
	<i>Monocarpia marginalis</i>	
	<i>Polyalthia cauliflora</i>	
	<i>Polyalthia cinnamomea</i>	
	<i>Polyalthia clavigera</i>	
	<i>Polyalthia macropoda</i>	
	<i>Polyalthia sumatrana</i>	
	<i>Popowia pisocarpa</i>	
	<i>Xylophia ferruginea</i>	
	<i>Xylophia malayana</i>	
Apocynaceae	<i>Alstonia angustriloba</i>	(pulai)
	<i>Alyxia reinwardthii</i>	
	<i>Chilocarpus costatus</i>	
	<i>Dyera costulata</i>	jelutong)
Araliaceae	<i>Arthrophyllum diversifolium</i>	
	<i>Schefflera heterophylla</i>	
	<i>Schefflera</i> sp.	
	<i>Trevesia burckii</i>	tapak hantu)
Aralidiaceae	<i>Aralidium pinnatifidum</i>	(tapak itik)
Bombacaceae	<i>Bombax valetonii</i>	(kekabu hutan)
	<i>Durio lowianus</i>	(durian daun)
Burseraceae	<i>Canarium littorale</i>	(kedondong gergaji)
	<i>Canarium patentinervium</i>	(kedondong hutan)
	<i>Dacryodes costata</i>	
	<i>Dacryodes rostrata</i>	kedondong kerut)
Cecropiaceae	<i>Poikilospermum suaveolens</i>	(tentawan)
Celastraceae	<i>Lophopetalum javanicum</i>	(mata ulat)
Chloranthaceae	<i>Chloranthus erectus</i>	sambau paya)
Connaraceae	<i>Aglaea borneensis</i>	
	<i>Cnestis palala</i>	semilat padang
Dilleniaceae	<i>Dillenia ovata</i>	
	<i>Dillenia reticulata</i>	
	<i>Tetracera akara</i>	mempelas
	<i>Tetracera scandens</i>	mempelas)
Dipterocarpaceae	<i>Diperocarpus cornutus</i>	(keruing gombang)
	<i>Shorea leprosula</i>	meranti tembaga)
	<i>Shorea parvifolia</i>	(meranti sarang punai)

Ebenaceae	<i>Diospyros apiculata</i>	
	<i>Diospyros argentea</i>	bedil lalat)
	<i>Diospyros cauliflora</i>	(kayu arang)
Elaeocarpaceae	<i>Elaeocarpus griffithii</i>	(mendong/medang kelawar)
	<i>Elaeocarpus nitidus</i>	
Euphorbiaceae	<i>Agrostitachys indica</i>	(jenjulong)
	<i>Antidesma coriaceum</i>	
	<i>Antidesma cuspidatum</i>	
	<i>Aporosa arborea</i>	sebasah
	<i>Aporosa prainiana</i>	
	<i>Baccaurea parviflora</i>	setambun
	<i>Baccaurea racemosa</i>	rambai tiong
	<i>Blumeodendron tokbrai</i>	gaham badak
	<i>Bridelia tomentosa</i>	kenidai
	<i>Claoxylon longifolium</i>	Salang
	<i>Croton laevifolius</i>	
	<i>Endospermum diadenum</i>	sesenduk
	<i>Entada phaseloides</i>	Beluru
	<i>Macaranga conifera</i>	meseapat
	<i>Macaranga hosei</i>	mahang
	<i>Macaranga gigantea</i>	kubin, mahang gajah
	<i>Macaranga lowii</i>	
	<i>Macaranga pruinosa</i>	
	<i>Mallotus miquelianus</i>	
	<i>Mallotus paniculatus</i>	
	<i>Mallotus peltatus</i>	
	<i>Neoscortechnii kingii</i>	
	<i>Pimelodendron griifithinum</i>	
<i>Ptychoppyxis caput var.medusae</i>		
Flacourtiaceae	<i>Caseria capitellata</i>	
	<i>Homalium longifolium</i>	
	<i>Pangium edula</i>	kepayang
Gesneriaceae	<i>Cyrtandra brachie</i>	
	<i>Cyrtandra cupulata</i>	meroyan kabut
	<i>Cyrtandra pendula</i>	meroyan panas
	<i>Henckelia platypus</i>	
	<i>Henckelia quinquevulnera</i>	
	<i>Henckelia crinata</i>	

Guttiferae	<i>Garcinia atroviridis</i>	asam gelugor
	<i>Garcinia bancana</i>	tengkawang
	<i>Garcinia opaca</i>	
	<i>Garcinia nervosa</i>	
	<i>Garcinia nigrolineata</i>	kandis
	<i>Garcinia scortechnii</i>	kandis ketam
Icacinaceae	<i>Gomphandra quadrifida</i>	
	<i>Stemonurus malaccensis</i>	
Lauraceae	<i>Actinodaphne intermedia</i>	
	<i>Alseodaphne peduncularis</i>	
	<i>Cinnamomum iners</i>	
	<i>Cinnamomum mollissimum</i>	
	<i>Cinnamomum sintoc</i>	
	<i>Litsea wrayi</i>	
Lechytidaceae	<i>Barringtonia fusiformis</i>	Putat
	<i>Barringtonia macrocarpa</i>	
	<i>Barringtonia macrostachys</i>	
	<i>Barringtonia scortechnii</i>	putat bukit
Leguminosae	<i>Bauhinia bidentata</i>	dedaup
	<i>Adenanthera malayana</i>	Saga
	<i>Callerya atropurpureum</i>	tulang daing
	<i>Cynometra malaccensis</i>	kekatong
	<i>Dialium platysepalum</i>	keranji paya
	<i>Koompasia excelsa</i>	tualang
	<i>Koompasia malaccensis</i>	kempas
	<i>Milletia sericea</i>	
	<i>Mucuna pruriens</i>	
	<i>Parkia speciosa</i>	Petai
	<i>Saracca cauliflora</i>	Gapis
	<i>Sindora coricea</i>	sepetir
Loganiaceae	<i>Fagrea racemosa</i>	kopi sepuleh
Lythraceae	<i>Lagerstroemia speciosa</i>	bungor raya

Melastomaceae	<i>Clidemia hirta</i>	senduduk bulu
	<i>Dissochaeta pallida</i>	
	<i>Melastoma malabathricum</i>	senduduk
	<i>Memeceylon dichotomum</i>	
	<i>Memeceylon intermedium</i>	nipis kulit
	<i>Memeceylon lilacinum</i>	nipis kulit
	<i>Oxyspora bullata</i>	
	<i>Pachycentria constricta</i>	
	<i>Phyllagathis rotundifolia</i>	tapak leman
	<i>Ptenandra echinata</i>	sial menahun
Meliaceae	<i>Aglaiia odoratissima</i>	
	<i>Lansium domesticum</i>	langsap hutan
	<i>Reinwardtiodendron cinereum</i>	Bekak
	<i>Sandoricum koetjape</i>	Sentol
Menispermaceae	<i>Coscinium fenestratum</i>	mengkunyit
	<i>Pericampylus glaucus</i>	
	<i>Tinomiscium petiolare</i>	mengkunyit
	<i>Tinospora</i> sp.	
Moraceae	<i>Artocarpus elasticus</i>	terap nasi
	<i>Artocarpus lanceifolius</i>	keledang
	<i>Artocarpus lowii</i>	
	<i>Artocarpus scortechnii</i>	terap hitam
	<i>Ficus fistulosa</i>	ara keelmpong
	<i>Ficus vulva</i>	ara sungai
	<i>Ficus hispida</i>	ara sungai
	<i>Ficus sinuata</i>	
	<i>Ficus variegata</i>	
	<i>Ficus virens</i>	
	<i>Streblus elongatus</i>	
Myristicaceae	<i>Horsfieldia</i> sp.	
Myrsinaceae	<i>Ardisia crenata</i>	
	<i>Ardisia colorata</i>	
	<i>Ardisia korthalsiana</i>	
	<i>Ardisia villosa</i>	
	<i>Ardisia wrayi</i>	
	<i>Labisia pumilla</i>	
Olacaceae	<i>Ochanostachys amentacea</i>	petaling
	<i>Scorodocarpus borneensis</i>	kulim, bawang hutan
Pandanaceae	<i>Galleria fulva</i>	

Piperaceae	<i>Piper porphyrophyllum</i>
Rubiaceae	<i>Aidia densiflora</i>
	<i>Catunaregam tomentosa</i>
	<i>Diplospora lasiantha</i>
	<i>Gaertnera vaginans</i> ssp.
	<i>Junghuhniana</i>
	<i>Lasianthus</i> sp.
	<i>Portenandria anisophylea</i>
	<i>Psycothria malayana</i>
	<i>Saprosma glomerulata</i>
	<i>Urophyllum glabrum</i>
Rutaceae	<i>Luvunga</i> sp.
	<i>Micromelium hirsutum</i>
Sapindaceae	<i>Lepisanthes tetraphylla</i>
	<i>Pometia pinnata</i>
	<i>Xerospermum noronhianum</i>
Simaroubaceae	<i>Eurycoma longifolia</i>
Sterculiaceae	<i>Pterospermum javanicum</i>
	<i>Scaphium linearicarpum</i>
	<i>Scaphium macropodum</i>
	<i>Sterculia parvifolia</i>
Tiliaceae	<i>Microcos latifolia</i>
	<i>Schoutenia accerescens</i>
Verbenaceae	<i>Clerodondrum deflexum</i>
	<i>Teijsmanniodendron coriaceum</i>
	<i>Vitex pinnata</i>
	<i>Vitex vestita</i>
Violaceae	<i>Rinorea javanica</i>
Vitaceae	<i>Ampelocissus cinnamomea</i>
	<i>Cissus repens</i>
	<i>Cissus trifolia</i>
	<i>Cissus</i> sp.
	<i>Tetrastigma leucostaphyllum</i>

Table 2. List of edible wild fruits species

No.	Species	Family
1	Gnetaceae	<i>Gnetum tenuifolium</i>
2	Palmae	<i>Elaeiodoxa conferta</i>
3	Anacardiaceae	<i>Bouea macrophylla</i> <i>Bouea oppositifolia</i> <i>Mangifera sp.</i>
4	Annonaceae	<i>Goniothalamus macrophyllus</i>
5	Bombacaceae	<i>Durio lowianus</i>
6	Euphorbiaceae	<i>Baccaurea parvifolia</i> <i>B. racemosa</i>
7	Guttiferae	<i>Garcinia atroviridis</i> <i>Garcinia bancana</i> <i>Garcinia opaca</i> <i>Garcinia nervosa</i>
8	Lechyticidaceae	<i>Barringtonia fusiformis</i> <i>Barringtonia macrocarpa</i> <i>Barringtonia macrostachys</i> <i>Barringtonia scortechinii</i>
9	Leguminosae	<i>Parkia speciosa</i>
10	Meliaceae	<i>Lansium domesticum</i> <i>Sandoricum koetjape</i>
12	Moraceae	<i>Artocarpus elasticus</i> <i>Artocarpus lanceifolius</i> <i>Artocarpus lowii</i> <i>Artocarpus scortechinii</i>
13	Sapindaceae	<i>Pometia pinnata</i> <i>Xerospermum noronhianum</i>

