RAIN FORESTS OF WESTERN AUSTRALIA

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HISTORICAL

Botanical collecting in the Kimberley District began as early as 1688 with the visit of William Dampier who also recorded a general description of some vegetation (Grant-Richards, 1906) but the first contact with the vine-forest biome would appear to have been made by botanical collector Alan Cunningham in 1819-1822 when he accompanied the expedition of Lieut. P.P. King charting the Kimberley coasts (King, 1827). Many of Cunningham's specimens are derived from the vine forest biome, but he left no published record of vegetation types. In his unpublished journals Cunningham does however refer to the vine forest biome. On the 16 September 1820 he recorded the following from the Hunter River: "steep rocky ridges of hills, furrowed with channels formed by the torrents that doubtless fall from their elevation during the season of rains. Thus interesting brushes clothe the declivities with a luxuriant verdure. These thickets afforded me some variety of plants"; and again on the 17 September "Thickets clothing the broad bases of the lofty towering boundary cliffs at length became interesting. In them I observed some remarkably fine large trees of Myristica....., and a tree of very regular ornamental growth, having dark green opposite leaves, nerved as in Calophyllum..... The Cryptocarya was likewise frequent".

The first recognisable encounter with the vine forest biome which has been found in the literature was recorded by Julius Brockman in 1880. Brockman (1880) made particular note of the dense vine thickets found behind the coastal sand dunes on the north end of the Dampier Peninsula: "We turned into the beach again at sunset..... and had hard work to force our way through the jungle that skirts the sea hills, having to get out our knives to cut the tangled masses of creeper, often as strong as rope".

The early encounters tended to be superficial and inconclusive, and it was not until 1923 that the first general account of the vegetation of the Kimberley was given by C.A. Gardner (1923), who explored the north-west Kimberley botanically in 1921, travelling with the expedition of W.R. Easton (1922). Even then, however, Gardner failed to observe and record the vine thickets and forests, speaking in his account (p.24) of the "total absence of rain forest". Unaccountably he apparently never saw the numerous discrete patches in the Mitchell Plateau area, although his party traversed the plateau from end to end. There is no mention of any elsewhere, such as in the Prince Regent, nor does the list of species found on the expedition suggest that he had collected in them.

In a later work (1944), Gardner emphasised the prominence in the flora of the Kimberley of an "Indo-Melanesian Element" equated with the "Palaeotropic Element" of the Australian flora defined by Hooker in 1856. On scrutiny, however, it is found that Gardner was referring generally to tropical species found in the littoral, riverain forest, woodlands and savanna's, rather that to the vine forest biome to which the term might more appropriately relate.

Traversing of the north Kimberley by members of the Land Research Division of C.S.I.R.O. in 1954 was limited by inaccessibility of the country and there was equally no mention in their report of rain forests (Speck et al. 1960). In fact Speck stated (p.41): "There are no rain forests, usually

considered characteristic of the tropics, and even the monsoon forests described for the Katherine-Darwin region by Christian and Stewart (1953) are absent". However, the existence of vine thickets at the Mitchell Plateau was eventually brought to light in the course of a Geological Survey in 1965 carried out jointly by the Bureau of Mineral Resources and the Geological Survey of Western Australia, and reported in the explanatory notes to the Montague Sound 1:250 000 geological sheet (Allen 19665, 1971). In 1965 the Amax Bauxite Corporation began to investigate bauxite deposits on the Mitchell Plateau, a mining camp was established and linked to the outside world by air and by a vehicle track. As a result, scientists of many disciplines visited the Plateau and became aware of the vine thickets. The first actual study was made by J.S. Beard in 1974 who published a preliminary description and classification, and a map showing the more important patches (Beard 1976). Beard also drew attention to the relatively more extensive occurrence of vine thickets on the Bougainville Peninsula, which no botanist had yet visited. At about the same time P.G. Wilson and N.G. Marchant of the Western Australian Herbarium examined a number of the islands off the north-west Kimberley coast during biological survey expeditions co-ordinated by the Department of Fisheries and Wildlife, and reported and collected in patches of vine thicket (Burbidge and McKenzie, 1978).

Also in 1974 a biological survey of the Prince Regent River Reserve in the north Kimberley was co-ordinated by the Department of Fisheries and Wildlife (Miles & Burbidge, 1975). This gave no general account of the vegetation, the work being based on detailed recording of 12 sites. However, the expedition was able to report finding "semi-deciduous microphyll vine thickets" at three of these, and closed forest of Calophyllum sil., Melaleuca leucadendra, Carallia brachiata, and Myristica insipida along river and creek beds. Shortly after, a similar survey of the Drysdale River National Park disclosed the presence of three communities of semi-deciduous microphyll vine thicket and one of riverine closed forest as above.

The zoology of the Mitchell Plateau area received further detailed study from a joint field expedition mounted by the Western Australian Museum, and the Field Museum of Natural History, Chicago in 1976-77. Related botanical surveys were made by R.J. Hnatiuk and K.F. Kenneally of the Western Australian Herbarium in 1976, 1978 and 1979, and their report on the vegetation and flora of the plateau was included in the Museum publication (Hnatiuk and Kenneally, 1981). A list and description of 26 communities (one being the vine thickets) was given, and an annotated list of the flora of which approximately 80 taxa appear to belong to the vine forest biome. J.S. Beard and K.A. Clayton-Greene were at the Plateau conducting a survey for the mining company in 1978 and 1979 when the Bougainville Peninsula was also visited. K.F. Kenneally returned to the Plateau in January, April, October and December 1982. In April and October he visited the Bougainville Peninsula during which time extensive helicopter traverses were made and botanical specimens collected. These visits resulted in a private report to the company (Beard, unpub.), a paper on the vine thickets of Bougainville (Beard, Clayton-Greene and Kenneally, 1984) and another on the fire ecology of the vine thickets of the north Kimberley (Clayton-Greene and Beard, 1984).

The known range of vine thickets was extended to the south-west Kimberley, an area of substantially lower rainfall, when a biological survey of the Dampier Peninsula documented their occurrence behind coastal dunes as foreshadowed by Brockman in 1880 (McKenzie and Kenneally, 1983). The thickets occur in frequent patches, more commonly at the north end of the Peninsula, on the lee side of the coastal dune system (Figs. 4-6). This habitat was not previously known to be occupied by vine thickets in Western Australia, though it is a common element in the Northern Territory and Queensland (Beard and Kenneally, in press).

It will be seen that the existence of the vine thicket biome has only become scientifically verified in Western Australia for less than 20 years. More work is still required to research and document it.

DISTRIBUTION AND ECOLOGY

The vine Forest Biome is represented in Western Australia only in the tropical portion of the State below 19°S latitude, an area known administratively as the Kimberley District and biogeographically as the Northern Botanical Province (Gardner 1944, Beard 1980), see map Fig. 1. Within this region the vine forest biome is present only in small scattered patches within 150 km or less of the north-west coast from Broome to Cape Londonderry, where the minimum rainfall is 600 mm per annum and the maximum 1500 mm. This rainfall occurs almost entirely in summer, during a short wet season of only four months duration (Fig. 2). The rainfall map is not entirely informative (Fig. 1) since outlying peninsulas and islands are known to be relatively dry, the highest rainfall occurring on elevated ground inland of the main coastline.

The patches of the biome are so small and scattered that their presence has only recently been recognised, as outlined in the previous section, and they could not be shown on the general vegetation map of the Kimberley District scale 1:1 000 000 (Beard 1979). Larger scale maps of the country surrounding the Admiralty Gulf where they are more concentrated have however, succeeded in representing the more important patches (Beard, 1976; Hnatiuk and Kenneally 1981; Beard, Clayton-Greene and Kenneally, 1984). Fig. 3.

These vary in size from groups of only a few plants to appreciable blocks of which the largest mapped - on the Mitchell Plateau - have been measured by planimeter to cover 11, 19 and 22 hectares.

The vegetation in these occurrences can be classified structurally and floristically into three types which correspond to those defined by Webb (1959) for the lowland areas of the Tropical Rainforest Region, e.g. complex mesophyll vine forest, semi-evergreen mesophyll vine forest and deciduous vine thicket. These represent three structural levels controlled by availability of moisture.

Complex mesophyll vine forest

As the tallest and most luxuriant of these communities, this occurs mainly lining the banks of rivers and creeks, and spreading laterally onto river plains. Trees reach heights of 20 m and correspondingly large diameters, and form a dense canopy. There is little undergrowth. Species recorded are listed in Table 1.

The forest is frequently bordered along river banks by a row of trees of Melaleuca leucadendra and Pandanus aquaticus, forming a riparian community distinct from the vine forest.

Semi-evergreen mesophyll vine forest (Figs. 8-12)

This can be found on moist sites throughout but is principally developed on and around the Mitchell Plateau where the rainfall is some 1200 - 1600 mm annually. Structure, where it is regular and can be interpreted, consists of scattered emergent mostly deciduous trees 12 - 15 m in height and up to 60 cm in diameter rising from a very dense understory of shrubs and creepers up to 3-5 m tall. The emergent trees tend to be liberally festooned with creepers. Other vascular epiphytes were not observed except rarely orchids (Cymbidium canaliculatum and Dendrobium dicuphum). There is little or no ground vegetation and the soil surface is covered with fallen leaves. Within each isolated forest patch, groups are found where the taller trees are crowded and dense forming a forest with little undergrowth, but at least half of the area has normally been badly damaged by fire and cyclones, and subsequently overrun by creepers and scandent Capparis and Flagellaria indica, forming a tangled mass and making the vine thicket very impenetrable.

Floristic composition recorded is listed in Table 2.

Deciduous Vine Thicket (Figs. 13 & 14)

As the lower and most open of these communities, deciduous vine thicket is found where rainfall is low (600-1200 mm) or the site is relatively dry. Structure is still basically thicket with scattered emergent trees, but these are down to 6-9 m in height, often more sparsely scattered, and the shrub layer also lower and more open. As in Webb's (1959) definition virtually all emergents are deciduous, and many understorey species are deciduous or semi-evergreen. In Western Australia however, swollen stemmed "bottle trees" are absent. Many component species are shared with the semi-evergreen vine forest so that a separate table for composition has not been compiled.

Zizyphus quadrilocularis becomes the commonest tree and in places could be said to be dominant. Ficus, Litsea, Pouteria and Wrightia appear to be absent, but instead we have Diospyros montana, Euphorbia plumerioides, Harrisonia brownii, Lysiphyllum cunninghamii, Mimusops elengi, Murraya paniculata, Strychnos lucida, Turraea brownii.

Creepers noted include: Abrus precatorius, Ampelocissus acetosa, Asparagus racemosa, Cayratia trifolia, Dioscorea transversa, Operculina sp. and Sarcostemma australe.

HABITATS

The country in the north-west Kimberley is underlain partly by sandstones and partly by basalt. The sandstone country is mostly very rugged, consisting in a high degree of stacks of bare rock with vegetation growing out of crevices and soil cover only in some low-lying places. The closer to the coast, the more rugged and barren the country becomes, but further inland it

becomes more even, undulating and soil covered. Sandstone country is typically dissected by narrow gorges formed along joints, so that drainage has a rectilinear pattern. Basalt country on the other hand typically consists of rounded hills of moderate to low relief with a dendritic drainage pattern. Outcrops of boulders and sheet rock are a common feature. Near the coast relief is greater and dissection of individual lava flows from the basaltic groundmass gives rise to a topography of pronounced structural benches and mesas.

Remnants of a duricrusted plateau surface are preserved here and there, principally on the basalt, the largest of these being the Mitchell Plateau with a surface area of 220 km^2 (Allen, 1971), and plateau remnants on the Bougainville Peninsula with 85 km^2 (Amax report, unpubl.). The duricrust is bauxite, some 2 m thick, underlain by a kaolinised weathered zone averaging 17 m in thickness (Amax report, unpubl.). Remnants of residual plateau take the form of conspicuous mesas bordered by deeply indented scarps.

The greatest number of conspicuous patches of vine forest and thicket is to be found in the Mitchell Plateau area in association with the benched basalt topography where most patches have a basalt cliff of varying height and steepness on their upper side and are growing on a jumbled mass of basalt boulders below. A second very common habitat, however, is the rubble-strewn breakaway slope of the duricrusted plateau, where small discontinuous patches of vine forest and thicket occur along it or at its foot. Here again they are growing in rocky ground at the foot of a scarp.

On the Bougainville Peninsula, deciduous vine thicket is widespread on the undulating basalt country and may form up into semi-deciduous vine forest on scree slopes of the plateau. In both cases Eucalyptus savanna woodland is also found either in pure patches or in mixture with vine thicket elements.

Most of the north-west coastal country between King Sound and the Admiralty Gulf has not yet been botanically explored, but if inspected from

the air very numerous patches of vine forest and thicket can be seen, normally in gullies, gorges and at the foot of scarps. Such occurrences are by no means confined to the basalt country but may occur even if less frequently on the sandstone as has been documented in the Drysdale River National Park (Kabay and Burbidge, 1977) and at Cape Londonderry (George, 1978).

Riverain vine forest appears likewise to be indifferent to the geological source of the alluvial substrate.

An entirely different habitat not so far encountered in the north-west Kimberley is found on the Dampier Peninsula further south where the annual rainfall is from 600-800 mm. Here both vine forests and thickets occur on older stabilised coastal dunes. The soils are deep dune sands, white except for a superficial dark grey organic layer covered by leaf litter up to 6 cm in depth (McKenzie and Kenneally, 1983). This is a very common habitat for the vine forest biome in tropical Australia and its absence from the north-west Kimberley is most likely only due to the rarity of the coastal dunes.

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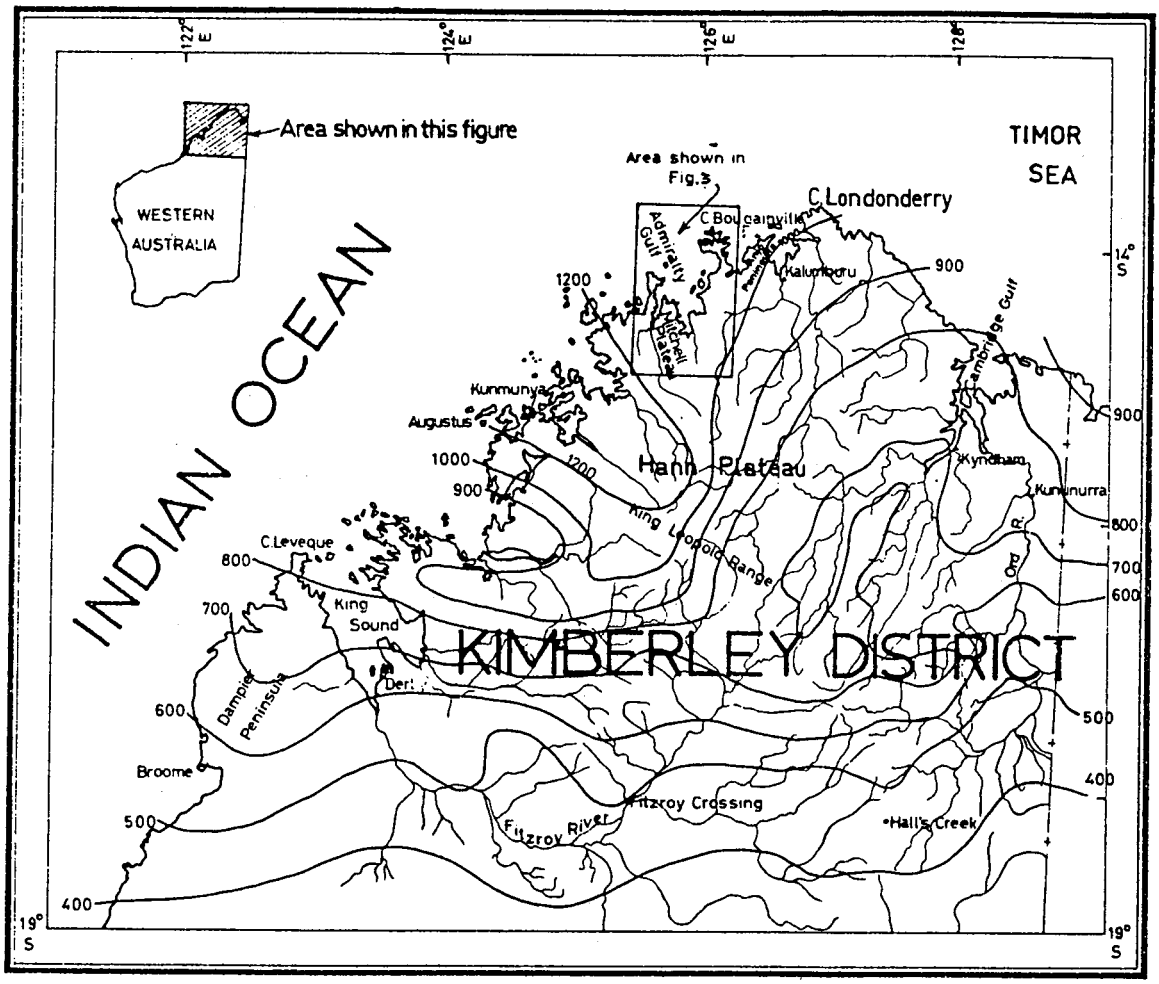

Fig. 1 Map of the Kimberley District, Western Australia, showing localities mentioned in the text, together with isohyets for mean annual rainfall in millimetres (from Beard, 1976).

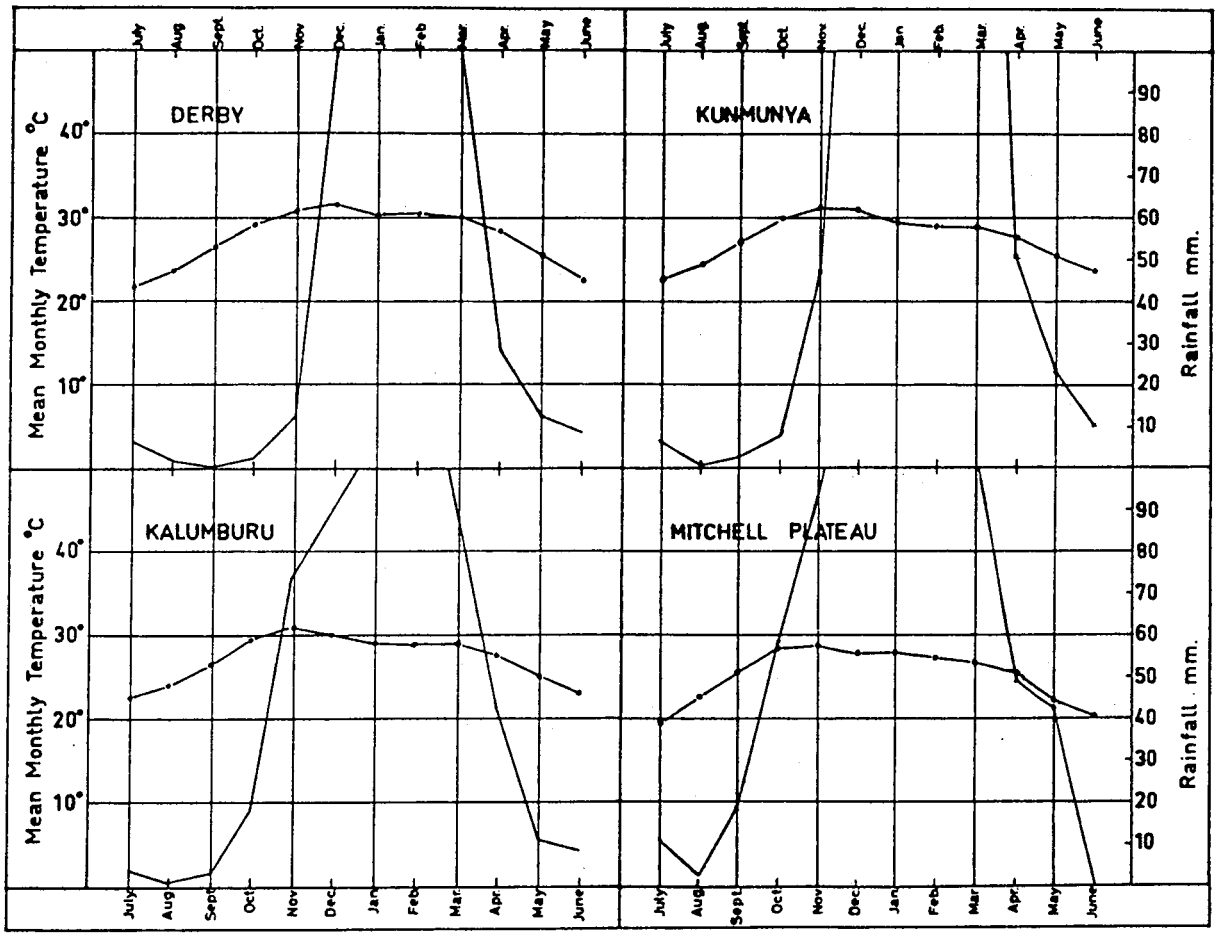

Fig. 2 Ombrothermic Diagrams (after Bagnouls & Gaussen 1957) for relevant rainfall stations in the Kimberley. The length of the wet season is given by the distance along the temperature graph (broken line) over which the rainfall (continuous line) rises above it (from Beard, 1976).

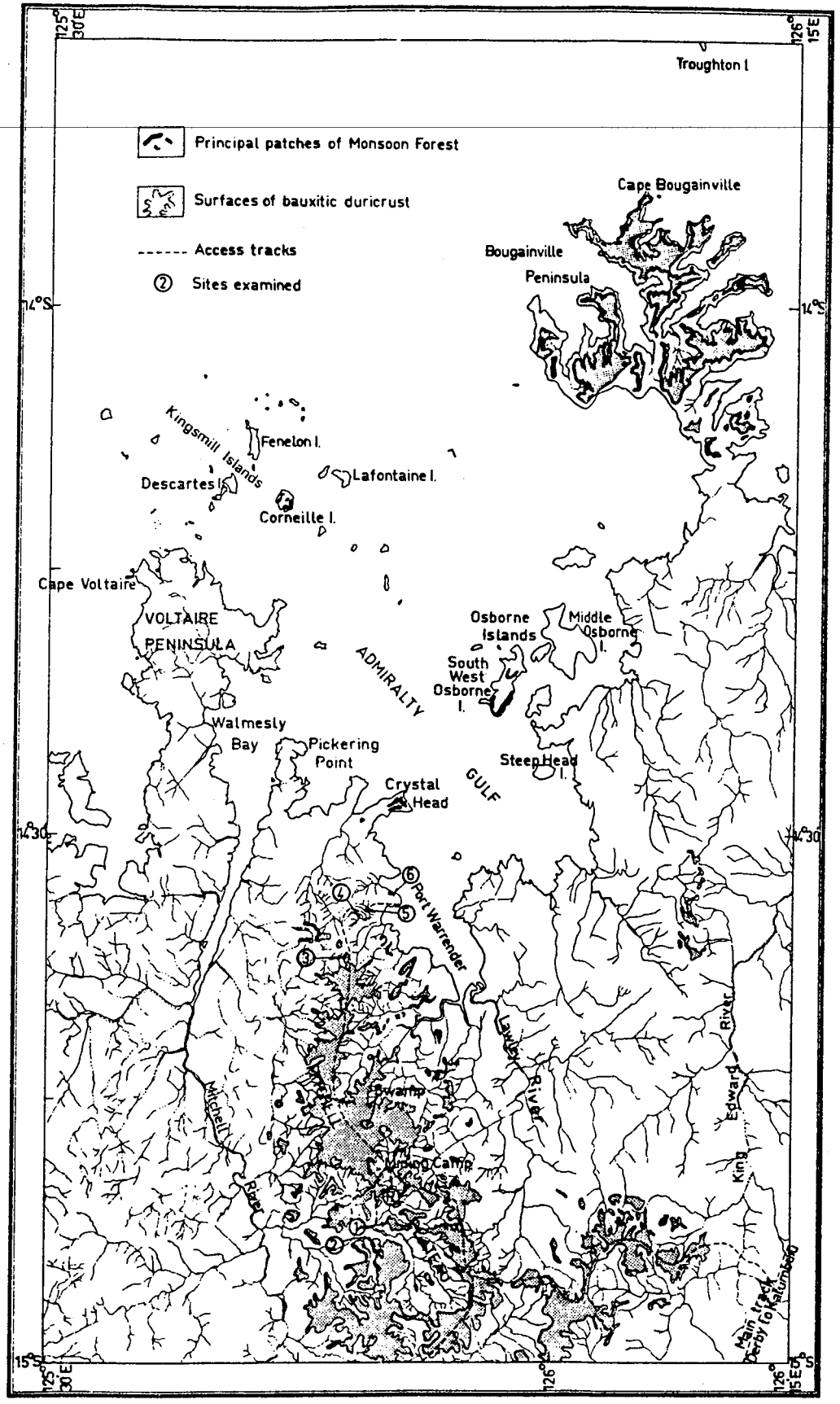

Fig.3 Map of the Admiralty Gulf area showing the principal patches of monsoon forest and their relation to duricrusted plateau remnants (from Beard, 1976).

CAPTIONS TO BLACK-AND-WHITE FIGURES

(K.F. Kenneally & J.S. Beard)

Fig. 4 Aerial view of the zonation on the west coast of the Dampier Peninsula near Point Coulomb. A broad beach encroaching inland with the stabilised dunes covered with Melaleuca scrub. At the base of the dune a broad belt of vine thicket occurs which abruptly gives way to pindan (Acacia shrubland) vegetation (Photo KFK: April, 1977).

Fig. 5 A patch of Diospyros ferrea var. humilis (Ebenaceae) low forest located at the base of a dune on the Dampierland Peninsula (Photo KFK: June, 1981).

Fig. 6 Vine thicket at the base of a dune on the Dampier Peninsula. Tree species include Melaleuca cajuputi, and Terminalia petiolaris with understorey species such as Dodonaea platyptera and Exocarpos latifolius (Photo KFK: May, 1977).

Fig. 7 Aerial view of a patch of semi-evergreen mesophyll vine forest on basalt at Mitchell Plateau (Photo KFK: Jan, 1982).

Fig. 8 Semi-evergreen mesophyll vine forest at Lone Dingo, Mitchell Plateau. This photograph taken in October, 1982 shows two of the emergent, deciduous, tree species Zizyphus quadrilocularis (left) and Sterculia quadrifida (right) leafless at the end of the dry season. Note the generally open canopy and depauperate ground flora (Photo KFK).

Fig. 9 S-e. M. Vine Forest at Lone Dingo, Mitchell Plateau. This photograph taken in December, 1982, the beginning of the wet season, shows Sterculia quadrifida (right) in leaf and Zizyphus quadrilocularis with the first flush of new leaves. (Photo KFK).

Fig. 10 S-e. M. Vine Forest at Lone Dingo, Mitchell Plateau. This photograph taken in February, 1979, shows both Zizyphus and Sterculia in full leaf, a general thickening of the canopy and the development of vine species (Photo KFK).

Fig. 11 S-e. M. Vine Forest at Lone Dingo, Mitchell Plateau. This photograph taken in May, 1979, at the end of the wet, shows

the full development of the vine forest (Photo KFK).

Fig. 12 A composite photo of vine forest on the NW side of Mitchell Plateau. Sterculia quadrifida in the emergent deciduous tree and Garuga floribunda is the large tree to the right. In the foreground is savanna woodland dominated by Eucalyptus polycarpa, the fan-palm (Livistona eastonii) and the grasses Heteropogon contortus and Coelorachis rottboellioides (Photo KFK: May, 1978).

Fig. 13 Aerial view of the north-facing shore of an unnamed inlet immediately to the north of Freshwater Bay, Bougainville Peninsula. The lateritic plateau and ironstone cliff can be seen, with vine forest and thicket on the scarp below (Photo KFK: April, 1982).

Fig. 14 Aerial view of sandstone cliff at Cape Londonderry with vine thicket on the basal scree and mangroves fringing the sea (Photo A.S. George: Aug. 1975).

TABLE 1. FLORA OF THE COMPLEX MESOPHYLL VINE FOREST

Canopy Trees	
Alphitonia excelsa	Rhamnaceae
Alstonia actinophylla	Apocynaceae
Bombax ceiba	Bombacaceae
Calophyllum sil	Clusiaceae
Canarium australianum	Burseraceae
Carallia brachiata	Rhizophoraceae
Cryptocarya cunninghamii	Lauraceae
Denhamia obscura	Celastraceae
Euodia elleryana	Rutaceae
Ficus coronulata	Moraceae
Ficus racemosa var. racemosa	Moraceae
Ficus virens var. sublanceolata	Moraceae
Ganophyllum falcatum	Sapindaceae
Ilex arnhemensis	Aquifoliaceae
Lophostemon grandiflorus subsp. riparius	Myrtaceae
Melaleuca leucadendra	Myrtaceae
Miliusa sp. (KFK 8748)	Annonaceae
Myristica insipida	Myristicaceae
Nauclea orientalis	Rubiaceae
Polyalthia holtzeana	Annonaceae
Syzygium eucalyptoides	Myrtaceae
Syzygium operculatum	Myrtaceae
Syzygium suborbiculare	Myrtaceae
Terminalia platyphylla	Combretaceae
Timonius timon	Rubiaceae
Small Trees	
Alphitonia excelsa	Rhamnaceae
Antidesma ghaesembilla	Euphorbiaceae
Cassine melanocarpa	Celastraceae
Drypetes lasiogyna	Euphorbiaceae
Emmenospermum cunninghamii	Rhamnaceae
Melaleuca viridiflora	Myrtaceae
Nauclea orientalis	Rubiaceae
Pandanus spiralis var. multimammillatus	Pandanaceae
Piliostigma malabaricum	Caesalpiniaceae

Syzygium eucalyptoides	Myrtaceae
Timonius timon	Rubiaceae
Xanthostemon eucalyptoides	Myrtaceae

Shrubs

Acacia holosericea	Mimosaceae
Acacia kelleri	Mimosaceae
Acacia orthocarpa	Mimosaceae
Dodonaea lanceolata	Sapindaceae
Emmenospermum cunninghamii	Rhamnaceae
Ficus podocarpifolia	Moraceae
Glycosmis trifoliata	Rutaceae
Jacksonia argentea	Papilionaceae
Ludwigia octovalvis	Onagraceae
Osbeckia australiana	Melastomataceae

Climbers

Flagellaria indica	Flagellariaceae
Passiflora foetida var. hispida	Passifloraceae
Smilax australis	Smilacaceae

Herbs

Canscora diffusa	Gentianaceae
Ludwigia octovalvis	Onagraceae
Mitrasacme foliosa	Loganiaceae
Monochoria cyanea	Pontederiaceae

Graminoids

Arundinella nepalensis	Poaceae
Coelorachis rottboellioides	Poaceae
Dimeria ornithopoda	Poaceae
Eriachne pauciflora	Poaceae
Sclerandrium truncatiglume	Poaceae

Corms

Colocasia esculenta	Araceae

Ferns

Acrostichum speciosum	Pteridaceae
Blechnum orientale	Blechnaceae
Cyclosaurus interruptus	Thelypteridaceae

Dicranopteris linearis	Gleicheniaceae
Helminthostachys zeylanica	Ophioglossaceae
Lindsaea ensifolia	Lindsaeaceae
Lygodium microphyllum	Schizaeaceae
Stenochlaena palustris	Polypodiaceae

TABLE 2. FLORA OF THE SEMI-EVERGREEN MESOPHYLL VINE FOREST AND DECIDUOUS VINE THICKET.

(* indicates deciduous or semi-deciduous species).

Canopy Trees	
Aglaia elaeagnoidea	Meliaceae
*Albizia lebbeck	Mimosaceae
Alphitonia excelsa	Rhamnaceae
Atalaya variifolia	Sapindaceae
*Bombax ceiba var. leiocarpum	Bombacaceae
*Brachychiton sp. (KFK 8573)	Sterculiaceae
Bridelia tomentosa	Euphorbiaceae
Calophyllum sil	Clusiaceae
Canarium australianum	Burseraceae
Carallia brachiata	Rhizophoraceae
Celtis philippinensis	Ulmaceae
Claoxylon tenerifolium	Euphorbiaceae
Cryptocarya cunninghamii	Lauraceae
Cupaniopsis anacardioides	Sapindaceae
Diospyros ferrea var. humilis	Ebenaceae
Diospyros maritima	Ebenaceae
Drypetes lasiogyna	Euphorbiaceae
Dysoxylum latifolium	Meliaceae
Ficus racemosa	Moraceae
*Ficus virens	Moraceae
*Ganophyllum falcatum	Sapindaceae
*Garuga floribunda	Burseraceae
Lagerstroemia archerana	Lythraceae
Lepisanthes rubiginosa	Sapindaceae
Litsea chinensis	Lauraceae
Lysiphyllum cunninghamii	Caesalpiniaceae
Melaleuca dealbata	Myrtaceae
Micromelum minutum	Rutaceae
Myristica insipida	Myristicaceae
Mimusops elengi	Sapotaceae
Planchonella pohlmanniana	Sapotaceae
Planchonella arnhemica	Sapotaceae
Polyalthia holtzeana	Annonaceae
Polyaulax cylindrocarpa	Annonaceae

Pouteria sericea	Sapotaceae
*Sterculia quadrifida	Sterculiaceae
Syzygium angophoroides	Myrtaceae
Terminalia cunninghamii	Combretaceae
*Terminalia petiolaris	Combretaceae
Terminalia platyphylla	Combretaceae
Vavaea australiana	Meliaceae
*Vitex glabrata	Verbenaceae
Wrightia pubescens	Apocynaceae
*Zanthoxylum parviflorum	Rutaceae
*Zizyphus quadrilocularis	Rhamnaceae

Small Trees

Aglaia elaeagnoidea	Meliaceae
*Albizia lebbeck	Mimosaceae
Alectryon kimberleyanus	Sapindaceae
Alphitonia excelsa	Rhamnaceae
Antidesma ghaesembilla	Euphorbiaceae
Atalaya salicifolia	Sapindaceae
Atalaya variifolia	Sapindaceae
*Brachychiton sp. (KFK 8573)	Sterculiaceae
Buchanania obovata	Anacardiaceae
Canarium australianum	Burseraceae
Capparis quiniflora	Capparaceae
Capparis umbonata	Capparaceae
Cassine melanocarpa	Celastraceae
Celtis philippinensis	Ulmaceae
Clerodendrum floribundum	Verbenaceae
Cordia subcordata	Boraginaceae
Croton tomentellus	Euphorbiaceae
Denhamia obscura	Celastraceae
Diospyros maritima	Ebenaceae
Dolichandrone heterophylla	Bignoniaceae
Drypetes lasiogyna	Euphorbiaceae
Dysoxylum latifolium	Meliaceae
Euphorbia plumerioides	Euphorbiaceae
Exocarpos latifolius	Santalaceae
Ficus opposita var. indecora	Moraceae
Ficus racemosa	Moraceae
Ficus virens	Moraceae
Garuga floribunda	Burseraceae

Glochidion disparipes	Euphorbiaceae
Glycosmis sapindoides	Rutaceae
Grewia breviflora	Tiliaceae
Grewia spp. (KFK 5128, 6619, 6993, 7004, 7097, 7823)	Tiliaceae
Jasminum molle	Oleaceae
Lysiphyllum cunninghamii	Caesalpiniaceae
Melochia umbellata	Sterculiaceae
Mimusops elengi	Sapotaceae
Pavetta brownii	Rubiaceae
Pavetta muelleri	Rubiaceae
Polyaulax cylindrocarpa	Annonaceae
Pouteria sericea	Sapotaceae
Planchonella pohlmaniana	Sapotaceae
Psychotria affin. nesophila (KFK 8113)	Rubiaceae
Randia cochinchinensis	Rubiaceae
Rapanea porosa	Myrsinaceae
Securinega melanthesioides	Euphorbiaceae
Terminalia petiolaris	Combretaceae
*Vitex acuminata	Verbenaceae
*Vitex glabrata	Verbenaceae
*Vitex sp. (KFK 7774, 7901)	Verbenaceae
Zanthoxylum parviflorum	Rutaceae
*Zizyphus quadrilocularis	Rhamnaceae

Shrubs

Alectryon kimberleyanus	Sapindaceae
Atalaya hemiglauca	Sapindaceae
Breynia cernua	Euphorbiaceae
Cadaba capparoides	Capparaceae
Cassia surattensis	Caesalpiniaceae
Cassine melanocarpa	Celastraceae
Celtis philippinensis	Ulmaceae
Citriobatus spinescens	Pittosporaceae
Clerodendrum floribundum	Verbenaceae
Clerodendrum tomentosum	Verbenaceae
Clerodendrum sp. (KFK 7091, 8556)	Verbenaceae
Croton tomentellus	Euphorbiaceae
Dicliptera leonotis	Acanthaceae
Diospyros montana	Ebenaceae

Dodonaea platyptera	Sapindaceae
Exocarpos latifolius	Santalaceae
Ficus opposita var. indecora	Moraceae
Glochidion disparipes	Euphorbiaceae
Glycosmis sapindoides	Rutaceae
Grewia breviflora	Tiliaceae
Grewia orientalis	Tiliaceae
Harrisonia brownii	Simaroubaceae
Hibiscus vitifolius	Malvaceae
Hypoestes suaveolens	Acanthaceae
Jasminum didymum	Oleaceae
Jasminum molle	Oleaceae
Melhania oblongifolia	Sterculiaceae
Melochia umbellata	Sterculiaceae
Memecylon pauciflorum	Melastomataceae
Micromelum minutum	Rutaceae
Murraya paniculata var. ovatifoliata	Rutaceae
Paramignya trimera	Rutaceae
Parinari nonda	Chrysobalanaceae
Phyllanthus ciccoides	Euphorbiaceae
Plumbago zeylanica	Plumbaginaceae
Polyaulax cylindrocarpa	Annonaceae
Pouteria sericea	Sapotaceae
Santalum lanceolatum	Santalaceae
Trema aspera	Ulmaceae
Turraea virens	Meliaceae
Zizyphus quadrilocularis	Rhamnaceae

Climbers

Abrus precatorius	Papilionaceae
Adenia heterophylla subsp. australis	Passifloraceae
Alyxia spicata	Apocynaceae
Aristolochia indica	Aristolochiaceae
Asparagus racemosus	Asparagaceae
Caesalpinia globulorum	Caesalpiniaceae
Canavalia papuana	Papilionaceae
Canavalia rosea	Papilionaceae
Cansjera leptostachya	Opiliaceae
Capparis quiniflora	Capparaceae
Capparis sepiaria	Capparaceae
Cayratia trifolia	Vitaceae

Clematis pickeringii	Ranunculaceae
Cyathostemma micranthum	Annonaceae
Dioscorea bulbifera	Dioscoreaceae
Dioscorea transversa	Dioscoreaceae
Diplocyclos palmatus	Cucurbitaceae
Flagellaria indica	Flagellariaceae
Grewia oxyphylla	Tiliaceae
Gymnanthera nitida	Asclepiadaceae
Ichnocarpus frutescens	Apocynaceae
Ipomoea nil	Convolvulaceae
Ipomoea affin. abrupta	Convolvulaceae
Ipomoea trichosperma	Convolvulaceae
Ipomoea gracilis	Convolvulaceae
Jacquemontia paniculata	Convolvulaceae
Jasminum aemulum	Oleaceae
Jasminum didymum	Oleaceae
Malaisia scandens	Moraceae
Mallotus repandus	Euphorbiaceae
Marsdenia cinerascens	Asclepiadaceae
Marsdenia velutina	Asclepiadaceae
Marsdenia sp. (T. Farrell 977)	Asclepiadaceae
Operculina (KFK 5123)	Convolvulaceae
Pachygone ovata	Menispermaceae
Paramignya trimera	Rutaceae
Parsonsia velutina	Apocynaceae
Passiflora foetida var. hispida	Passifloraceae
Pisonia aculeata	Nyctaginaceae
Sarcostemma australe	Asclepiadaceae
Secamone elliptica	Asclepiadaceae
Smilax australis	Smilacaceae
Thunbergia arnhemica	Acanthaceae
Trichosanthes ovigera	Cucurbitaceae

Hemiparasites

Amyema benthamii	Loranthaceae
Cassytha capillaris	Lauraceae
Cassytha filiformis	Lauraceae

Bulbs

Amorphophallus glabra	Araceae

Epiphytes	
Dendrobium dicuphum	Orchidaceae
Herbs	
Achyranthes aspera	Amaranthaceae
Asparagus racemosa	Asparagaceae
Commelina sp. (KFK 7012, 7013, 7090)	Commelinaceae
Evolvulus sp. (KFK 5243, 6657)	Convolvulaceae
Hibiscus sp. nov. (KFK 8121)	Malvaceae
Hypoestes suaveolens	Acanthaceae
Kalanchoe crenata	Crassulaceae
Pupalia lappacea	Amaranthaceae

TABLE 3. FLORA OF VINE THICKETS OF MITCHELL PLATEAU

Trees	
Agalaia elaeagnoidea	Meliaceae
*Albizia lebbeck	Mimosaceae
Atalaya aff. variifolia	Sapindaceae
*Bombax ceiba var. leiocarpum	Bombacaceae
*Brachychiton sp. (KFK 8573)	Sterculiaceae
Bridelia tomentosa	Euphorbiaceae
Calophyllum sil	Clusiaceae
Canarium australianum	Burseraceae
Carallia brachiata	Rhizophoraceae
Claoxylon tenerifolium	Euphorbiaceae
Cryptocarya cunninghamii	Lauraceae
Cupaniopsis anarcardioides	Sapindaceae
Diospyros ferrea var. humilis	Ebenaceae
Drypetes lasiogyna	Euphorbiaceae
Dysoxylum latifolium	Meliaceae
Ganophyllum falcatum	Sapindaceae
Garuga floribunda	Burseraceae
Lagerstroemia archerana	Lytheraceae
Litsea chinensis	Lauraceae
Lysiphyllum cunninghamii	Caesalpinaceae
Myristica insipida	Myristicaceae
Mimusops elengi	Sapotaceae
Polyalthia holtzeana	Annonaceae
Pouteria sericea	Sapotaceae
*Stercularia quadrifida	Sterculiaceae
Syzygium angophoroides	Myrtaceae
*Terminalia petiolaris	Combretaceae
Wrightia pubescens	Apocynaceae
Zanthoxylum parviflorum	Rutaceae
*Zizyphus quadrilocularis	Rhamnaceae
Small Trees	
Aglaia elaeagnoidea	Meliace3ae
Albizia lebbeck	Mimosaceae
Alphitonia excelsa	Rhamnaceae
Antidesma ghaesembilla	Euphorbiaceae

Atalaya salicifolia	Sapindaceae
Atalaya variifolia	Sapindaceae
*Brachychiton sp. (KFK 8573)	Sterculiaceae
Canarium australanium	Burseraceae
Capparis umbonata	Capparaceae
Celtis philippinensis	Ulmaceae
Cordia subcordata	Boraginaceae
Croton tomentellus	Euphorbiaceae
Denhamia obscura	Celastraceae
Diospyros nitens	Ebenaceae
Dolichandrone heterophylla	Bignoniaceae
Dysoxylum latifolium	Meliaceae
Euphorbia plumerioides	Euphorbiaceae
Exocarpos latifolius	Santalaceae
Ficus opposita var. indecora	Moraceae
Garuga floribunda	Burseraceae
Glochidion disparipes	Euphorbiaceae
Glycosmis sapindoides	Rutaceae
Grewia sp. (KFK 5128, 7823, 6993, 7004)	Tiliaceae
Lysiphyllum cunninghamii	Caesalpiniaceae
Melochia umbellata	Sterculiaceae
Mimusops elengi	Sapotaceae
Pavetta sp.	Rubiaceae
Pouteria sericea	Sapotaceae
Psychotria sp.	Rubiaceae
Randia cochinchinensis	Rubiaceae
Rapanea porosa	Myrsinaceae
*Terminalia petiolaris	Combretaceae
*Vitex acuminata	Verbenaceae
*Vitex glabrata	Verbenaceae
*Vitex sp. (KFK 7774, 7901)	Verbenaceae
*Zizyphus quadrilocularis	Rhamnaceae
Planchonella pohlmaniana	Sapotaceae

Shrubs

Alectryon kimberleyanus	Sapindaceae
Atalaya hemiglauca	Sapindaceae
Breynia cernua	Euphorbiaceae
Cadaba capparoides	Capparaceae
Cassia surattensis	Caesalpiniaceae
Cassine melanocarpa	Celastraceae

Celtis philippinensis	Ulmaceae
Citriobatus spinescens	Pittosporaceae
Clerodendrum floribundum	Verbenaceae
Clerodendrum tomentosum	Verbenaceae
Hibiscus vitifolius	Malvaceae
Clerodendrum sp. (KFK 7091, 5152)	Verbenaceae
Crotalaria sp. (KFK 5334)	Papilionaceae
Dicliptera leonitis	Acanthaceae
Diospyros montana	Ebenaceae
Dodonaea platyptera	Sapindaceae
Exocarpos latifolius	Santalaceae
Ficus opposita var. indecora	Moraceae
Glochidion disparipes	Euphorbiaceae
Glycosmis sapindoides var. australiensis	Rutaceae
Harrisonia brownii	Simaroubaceae
Hibiscus vitifolius	Malvaceae
Hypoestes suaveolens	Asteraceae
Jasminum didymum	Oleaceae
Jasminum molle	Oleaceae
Melhania oblongifolia	Sterculiaceae
Melochia umbellata	Sterculiaceae
Memecylon pauciflorum	Melastomataceae
Micromelum minutum	Rutaceae
Murraya paniculata var. ovatifoliata	Rutaceae
Paramignya trimera	Rutaceae
Polyaulax cylindrocarpa	Annonaceae
Pouteria sericea	Sapotaceae
Trema aspera	Ulmaceae
Turraea virens	Meliaceae
Zizyphus sp. (KFK 5265)	Rhamnaceae
Parinari nonda	Chrysobalanceae

Climbers

Abrus precatorius	Papilionaceae
Adenia heterophylla subsp. australis	Passifloraceae
Asparagus racemosus	Asparagaceae
Canavalia papuana	Papilionaceae
Cansjera leptostachya	Opiliaceae
Capparis quiniflora	Capparaceae
Capparis sepiaria	Capparaceae