The floristics and structure of dry rainforest at Forty Mile Scrub National Park, north Queensland

R.J. Fensham

Fensham, R.J. (Queensland Herbarium, Queensland Department of Environment and Heritage, Meters Road, Indooroopilly Qld 4068) 1995. The floristics and structure of dry rainforest at Forty Mile Scrub National Park, north Queensland. Cunninghamia 4(3): 483–495. The floristics and structure of those areas of dry rainforest in a relatively natural condition at Forty Mile Scrub National Park (18°08'S 144°30'E) 140 km west of Cardwell, north Queensland are described. Trees make up about 36% of the 151 native taxa. *Notelaea microcarpa* is the dominant tree throughout most of the forest and *Alectryon connatus*, *Austromyrtus* sp. (Forty Mile Scrub, G.C. Stocker–Coll No. 1785), *Geijera salicifolia* and *Strychnos psillosperma* are also prominent tree species in the continuous tree canopy at 5–7 m height. Emergent trees are sparse. The stand structure of the dominant tree species in dry rainforest is characterised by a general lack of small size classes and it is suggested that recruitment of seedlings may be a phasic event coinciding with a series of wet years.

Introduction

Rainforest-related vegetation occurs in Australia under climatic regimes that ensure seasonally dry substrates for extended periods. Despite the apparent contradiction this vegetation is included within the ‘rainforest’ umbrella by virtue of the following features (see Fensham 1995):

1) closed canopy on well-soiled substrates
2) very sparse herbaceous layer
3) plants with taxonomic affinities to rainforest of high rainfall environments
4) mixed tree species dominance
5) fire retardance and sensitivity

The National Rainforest Conservation Programme has funded a recent wave of research directed towards broadscale plant and animal survey, functional ecology, autecology of individual species and conservation assessment of dry rainforest of the eastern seaboard and the monsoon rainforests of northern Australia (see McKenzie et al. 1991; Bowman 1992; Fensham 1995 for references). Despite the plethora of recent publications only Russell–Smith et al. (1993) provide a detailed description of a single rainforest type and none of these studies provides a description of the structure and floristics of an individual rainforest area.
Study area

Forty Mile Scrub National Park, 18°08'S 144°50'E, approximately 140 km due west from the coastal town of Cardwell in north Queensland (Fig. 1) is a classic example of inland dry rainforest vegetation (Webb & Tracey 1981; Stocker & Unwin 1986). Forty Mile Scrub National Park includes one of the larger areas of the fragmented dry rainforest archipelago in the vast expanse of eucalypt savanna and acacia scrub that characterise subcoastal tropical Australia. Site data from Forty Mile Scrub was included in two (sub-groups 4b and 6c) out of 16 segments of the floristic continuum represented by the rainforest of inland Queensland between latitudes 17°00' to 23°26.5'S that were surveyed by Fensham (1995).

Mean annual rainfall at the nearest long-term weather station, Mount Surprise (50 km to the W), is 803 mm, where about 80% of the rain falls between December and March (105 years of record; Bureau of Meteorology 1988). Between 1983 and 1992 complete rainfall records are available for six years but were unavailable for 1983, 1984, 1989 and 1991 (Bureau of Meteorology unpublished data). 1986 was the only year with above-average rainfall and total annual rainfall was only 398 and 555 in 1990 and 1991 respectively. Mean daily maximum temperature is 35.4°C in November and mean daily minimum temperature is 9.5°C in July (Bureau of Meteorology 1988).

Physical setting

Incised water courses are absent throughout the dry rainforest and all quadrats surveyed in this study had slopes of less than 5%. The main massif of dry rainforest (Fig. 1) is restricted to deeply weathered basalt soils of the McBride province (Isbell et al. 1976). The O-horizon is less than 2 cm deep and the dark reddish brown (5YR 3/3) clay loam A-horizon extends beyond 50 cm on the basalt soils (Fensham et al. 1994). The northwesterly patch of dry rainforest occurs on soils derived from lateritic substrates.

Methods

The largest patch of dry rainforest at Forty Mile Scrub National Park is 2380 ha and was the site of the following quadrat-based study from which the structural description was developed. A large portion of the dry rainforest at Forty Mile Scrub is severely degraded by the proliferation of the exotic shrub lantana (Lantana camara) and the incursion of fire (Fensham et al. 1994). These phenomena are probably the result of structural damage (Fensham et al. 1994). This project seeks to describe dry rainforest in relatively natural condition so quadrats were restricted to those areas of the rainforest where there was little (< less than 5000 plants per ha) or no lantana (Fig. 1).

Sampling was conducted in October and November 1992, using fifty 10 × 10 m quadrats spaced every 100 m along seven transects (Fig. 1).

In each quadrat the following were recorded: a) the diameter at breast height of all native trees and shrubs greater than 3 m tall; b) the identity of all plant species, except herbaceous ephemerals and grasses which could not be consistently identified during
the sampling period (taxonomic authorities follow Henderson 1994); c) an estimate of percentage canopy cover (as per Walker & Hopkins 1990) of trees greater than 4 m above ground; d) an estimate of the percentage cover of rock.

In a 1 m strip around the perimeter of each quadrat the following were recorded: e) the number and identity of all native shrubs and trees, greater than 50 cm tall and less than

![Locality map showing vegetation types and position of transects as thick black lines.](image-url)
3 m that have the potential to achieve greater than 2 m in height; and f) the number and identity of all native woody plants less than 50 cm tall.

A soil sample collected from between 2 and 10 cm depth from the centre of each quadrat was analysed for electrical conductivity using a TPS LC84 meter and pH using a TPS LC80 meter (TPS Pty Ltd, Brisbane). The distance of each plot to the edge of the rainforest was determined from aerial photography (1: 20 000).

Vascular plant species were also recorded during eight hours of foot traverse in the largest rainforest patch and two hours in the two next largest rainforest blocks (Fig. 1). Two hours of foot traverse in the large patch was conducted after considerable rain which had prompted growth and flowering of the ephemeral ground layer.

Analytical methods

All data were stored, manipulated and ordinated using the DECODA software (Minchin 1990). The non-metric multi-dimensional scaling technique (KYST) was performed in one dimension because of the monotonity of substrate and vegetation, using default settings and presence–absence data.

Relationships between the ordination scores, the basal area of individual tree species and the measured environmental variables were tested using Spearman’s rank correlation coefficients.

Stand structure histograms were prepared for the five most frequent tree species and for all species whose mature individuals are typically greater than 3 m tall.

Results

General description

The surface of the basaltic soils generally have low rock cover although slightly raised ridges occur throughout the dry rainforest with up to 90% rock cover (Table 1). Surface soils are neutral and pH varies between 6.0 and 7.5 (Table 1).

Existing checklists of plants for this area (Anon 1961; Kahn & Lawrie 1987) are out of date and difficult to reconcile with current names. An updated checklist is provided in Appendix 1; 151 native vascular plant species were recorded in the rainforest at Forty Mile Scrub National Park. Euphorbiaceae (12 species), Malvaceae (8 species) and Rubiaceae (8 species) are the largest families. Trees constitute 36% of the native taxa, 10% are small trees, 7% shrubs, 7% subshrubs, 11% vines, 25% herbs and 5% ferns (see Appendix 1 for lifeform definitions). Ninety-six percent of the native trees, shrubs and vines known from the scrub are known from within 1 km of the Queensland coast. In contrast, for the inland north Queensland dry rainforests as a whole, 87% of the species in those lifeform groups were not known from the Queensland coast (Fensham 1995).

The rainforest generally has greater than 50% canopy cover (Table 1). Table 2 shows the basal area, stem density and frequency of occurrence of the most common tree species
Table 1. Summary of environmental values in 50 dry rainforest 10 x 10 m quadrats at Forty Mile Scrub

<table>
<thead>
<tr>
<th></th>
<th>&gt; 4 m canopy cover (%)</th>
<th>rock cover (%)</th>
<th>pH</th>
<th>conductivity (mS cm⁻¹)</th>
<th>distance to savanna (km)</th>
<th>KYST1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value</td>
<td>20</td>
<td>0.0</td>
<td>6.0</td>
<td>0.01</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Mean value</td>
<td>53</td>
<td>9.8</td>
<td>6.8</td>
<td>0.10</td>
<td>0.624</td>
<td>0.59</td>
</tr>
<tr>
<td>Maximum value</td>
<td>95</td>
<td>90.0</td>
<td>7.5</td>
<td>0.30</td>
<td>2.0</td>
<td>1.52</td>
</tr>
</tbody>
</table>

Table 2. Percentage frequency, basal area and number of stems for all plants sampled greater than 1.4 m high. Only species occurring in five or more quadrats are included

<table>
<thead>
<tr>
<th>Species</th>
<th>Sampled frequency (%)</th>
<th>Basal area (m² ha⁻¹) (ha⁻¹)</th>
<th>number of stems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia aulacocarpa</td>
<td>38</td>
<td>0.9723</td>
<td>38</td>
</tr>
<tr>
<td>Acronychia laevis</td>
<td>14</td>
<td>0.2866</td>
<td>38</td>
</tr>
<tr>
<td>Alectryon connatus</td>
<td>80</td>
<td>1.0335</td>
<td>162</td>
</tr>
<tr>
<td>Alphitonia excelsa</td>
<td>30</td>
<td>0.0906</td>
<td>6</td>
</tr>
<tr>
<td>Antidesma parvifolium</td>
<td>12</td>
<td>0.0328</td>
<td>6</td>
</tr>
<tr>
<td>Austromyrtus sp. (Forty Mile Scrub G.C. Stocker 1785)</td>
<td>62</td>
<td>1.1832</td>
<td>262</td>
</tr>
<tr>
<td>Breynia oblongifolia</td>
<td>68</td>
<td>0.0088</td>
<td>16</td>
</tr>
<tr>
<td>Briedelia leichhardtii</td>
<td>52</td>
<td>0.8681</td>
<td>54</td>
</tr>
<tr>
<td>Canthium sp. R.J. Fensham 632</td>
<td>46</td>
<td>0.0776</td>
<td>74</td>
</tr>
<tr>
<td>Canthium vaccinifolium</td>
<td>66</td>
<td>0.0349</td>
<td>38</td>
</tr>
<tr>
<td>Carissa ovata</td>
<td>88</td>
<td>0.0028</td>
<td>8</td>
</tr>
<tr>
<td>Citriobatus spiniscens</td>
<td>64</td>
<td>0.1012</td>
<td>40</td>
</tr>
<tr>
<td>Cupaniopsis anacardioides</td>
<td>10</td>
<td>0.1855</td>
<td>6</td>
</tr>
<tr>
<td>Denhamia oleaster</td>
<td>56</td>
<td>0.5455</td>
<td>68</td>
</tr>
<tr>
<td>Diospyros humilis</td>
<td>80</td>
<td>0.6987</td>
<td>104</td>
</tr>
<tr>
<td>Drypetes deplanchei</td>
<td>36</td>
<td>2.3655</td>
<td>56</td>
</tr>
<tr>
<td>Ehretia membranifolia</td>
<td>22</td>
<td>0.3038</td>
<td>36</td>
</tr>
<tr>
<td>Erythroxylum australe</td>
<td>28</td>
<td>0.6385</td>
<td>26</td>
</tr>
<tr>
<td>Ficus platypoda</td>
<td>10</td>
<td>0.4560</td>
<td>8</td>
</tr>
<tr>
<td>Flueggea leucopyros</td>
<td>20</td>
<td>0.0303</td>
<td>8</td>
</tr>
<tr>
<td>Geijera salicifolia</td>
<td>72</td>
<td>0.7938</td>
<td>102</td>
</tr>
<tr>
<td>Notelaea microcarpa</td>
<td>78</td>
<td>3.5724</td>
<td>714</td>
</tr>
<tr>
<td>Ozothamnus cassinoides</td>
<td>60</td>
<td>0.1643</td>
<td>44</td>
</tr>
<tr>
<td>Pleiogyrium timorens</td>
<td>14</td>
<td>0.4556</td>
<td>14</td>
</tr>
<tr>
<td>Psychotria daphnoides</td>
<td>26</td>
<td>0.0000</td>
<td>0</td>
</tr>
<tr>
<td>Rapaneca variabilis</td>
<td>22</td>
<td>0.0203</td>
<td>40</td>
</tr>
<tr>
<td>Senna surraternsis subsp. surraternsis</td>
<td>10</td>
<td>0.0002</td>
<td>2</td>
</tr>
<tr>
<td>Siphonodon australis</td>
<td>18</td>
<td>0.6506</td>
<td>32</td>
</tr>
<tr>
<td>Strychnos psilosperma</td>
<td>52</td>
<td>3.4922</td>
<td>138</td>
</tr>
<tr>
<td>Turraea rubescens</td>
<td>34</td>
<td>0.0052</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total species</strong></td>
<td></td>
<td><strong>21.1295</strong></td>
<td><strong>2236</strong></td>
</tr>
</tbody>
</table>
occurring in sizes greater than 1.4 m high. There was an average of 11,155 seedlings and saplings (< 3 m high) per ha. The most continuous canopy layer is 5-7 m high and 
*Notelaea microcarpa* is the most dominant species within this layer. Other common tree species in this layer are *Alectryon connatus*, *Austromyrtus* sp. (Forty Mile Scrub G.C. Stocker 1785), *Drypetes deplanchei*, *Getjena salicifolia* and *Strychnos psilosperma*. Dry rainforest emergents protrude from the closed canopy to a height of between 8 and 15 m and include the species *Ailanthus triphysa*, *Brachychiton australis*, *Pleogynium timorense* and *Siphonodon australis*. Emergents of these relatively tall rainforest species > 20 cm dbh were recorded at a density of 26 trees per ha. Mature individuals of *Eucalyptus crebra*, *Eucalyptus erythrophloia* and *Eucalyptus tereticornis* to 20 m tall, species dominant in savanna vegetation surrounding the rainforest, are also emergent in some areas.

*Diospyros humilis* is common as a spreading small tree under the closed canopy of the forest, while *Carissa ovata* and *Cantium vaccinifolium* are spiny sclerophyllous shrubs in the understorey. The ephemeral ground layer has less than 5% cover following rain, with herbs and resurrection ferns in the family Sinopteridaceae (listed in Appendix 1) having sporadic distribution.

Two native species, *Margaritaria dubium-traceyi* and *Cyperus isabellinus*, were only recorded in the northwestern rainforest patch on lateritic substrate and not from the other surveyed patches on basalt.

Eight exotic species were recorded as naturalised in the forest. The shrub *Lantana camara* has infested a large proportion of the rainforest (Fenshaw et al. 1994) and the annual daisy *Ageratum conyzoides* is frequent in some areas following rain. The vine *Solanum seaborthianum* is common in some areas, while the other exotic species have only limited distribution in the rainforest.

**Ordination**

The KYST ordination axis was negatively correlated with rock cover and pH (Table 3). Thus variations in edaphic conditions may have some control over the relatively subtle vegetation patterns within the dry rainforest. However, the basal areas of only two of 13 common tree species had weak (0.01 < P < 0.05) correlations with rockiness (Table 3) and the abundance of none of nine small trees and shrubs showed any significant relationship with rockiness (Table 4; P > 0.05). The basal areas of four common tree species (Table 3) and the abundances of three small tree and shrub species (Table 3) were significantly (P < 0.05) correlated with the relatively minor variations in surface soil pH. The basal areas of seven of the common tree species and four of the common small tree and shrub species were not correlated to any measured environmental factor (Table 3 and 4).

The KYST ordination axis was also negatively correlated with the distance from the rainforest boundary although the basal area of no individual tree species was correlated with this factor. A significant negative correlation between the abundance of the small tree species *Rapanea variabilis* with the distance from the edge of the rainforest (Table 4) is indicative of the ecotonal habitat of this species.
Size class

The size class histogram for all tree species provides an indication of the overall structure of the forest (Fig. 2). The histogram reveals declining densities of trees as size classes increase. However, this histogram sheds little light on regeneration patterns in this particular dry rainforest because the majority of individuals in the small size classes are individuals of two tree species Diospyros humilis and Turraea pubescens that are only rarely represented in larger size classes. Alectryon connatus has the highest proportion (45.2%) of seedlings (< 50 cm high) relative to the other common species (Fig. 2). Low densities of small size classes are particularly marked for Austromyrtus sp. (Forty Mile Scrub G.C. Stocker 1785), Notelae microcarpa and Strychnos psilosperma (Fig. 2). These species have less than 13% seedlings and less than 26% seedlings and saplings (> 50 cm high; < 300 cm high) in combination.

Table 3. Spearman’s rank correlation coefficients between basal area of tree species, environmental variables and ordination scores. Only species occurring in ten or more quadrats are included

<table>
<thead>
<tr>
<th>Species</th>
<th>&gt; 4 m canopy cover</th>
<th>rock cover</th>
<th>pH</th>
<th>conductivity</th>
<th>distance to savanna</th>
<th>KYST1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia aulacocarpa</td>
<td>NS</td>
<td>-0.34*</td>
<td>-0.43**</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Austromyrtus sp.</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Forty Mile Scrub</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.C. Stocker 1785)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canthium sp.</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(R.J. Fensham 632)</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drypetes deplanchei</td>
<td>0.50***</td>
<td>NS</td>
<td></td>
<td></td>
<td>NS</td>
<td>-0.47***</td>
</tr>
<tr>
<td>Strychnos psilosperma</td>
<td>NS</td>
<td>0.33*</td>
<td></td>
<td></td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Turraea pubescens</td>
<td>NS</td>
<td>0.35*</td>
<td></td>
<td></td>
<td>NS</td>
<td>-0.32*</td>
</tr>
<tr>
<td>KYST1</td>
<td>NS</td>
<td>-0.29*</td>
<td></td>
<td></td>
<td>NS</td>
<td>-0.29*</td>
</tr>
</tbody>
</table>

Tree species with no significant relations to measured factors (P > 0.05): Alectryon connatus, Alphitonia excelsa, Denhamia oleaster, Diospyros humilis, Ehretia membranifolia, Geijera salicifolia, Notelae microcarpa

*** P < 0.001; ** P < 0.01; * P < 0.05; NS P > 0.05

Table 4. Spearman’s rank correlation coefficients between densities of small tree and shrub species, environmental variables and ordination scores. Only species occurring in ten or more quadrats are included

<table>
<thead>
<tr>
<th>Species</th>
<th>&gt; 4 m canopy cover</th>
<th>rock cover</th>
<th>pH</th>
<th>conductivity</th>
<th>distance to savanna</th>
<th>KYST1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bremia oblongifolia</td>
<td>NS</td>
<td></td>
<td>0.32*</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Briedelia leichhardtii</td>
<td>NS</td>
<td></td>
<td>0.32*</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Canthium vacciniifolium</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td>NS</td>
<td>0.40**</td>
</tr>
<tr>
<td>Ozothamnus cassinioide</td>
<td>NS</td>
<td></td>
<td>0.36*</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Rupanea variabilis</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
<td>NS</td>
<td>-0.36*</td>
</tr>
</tbody>
</table>

Small tree and shrub species with no significant relations to measured factors (P > 0.05): Carissa ovata, Citriobatus spiniscens, Fluegga leucopyros, Psychotria daphnoides

*** P < 0.001; ** P < 0.01; * P < 0.05; NS P > 0.05
Fig. 2. Frequency/size class histograms for all tree species (mature plants > 5m high) and the five most abundant tree taxa. H = height and other values represent diameter at breast height.
Discussion

There are studies that present stand structure from analogous closed tropical forests elsewhere in the dry tropics (e.g. Dittus 1977; Murphy and Lugo 1986). However, most studies do not include data on seedling and sapling densities or cannot be related to unit area. I was unable to locate any studies that provide complete stand structure for individual species in dry rainforest. Bowman and Fensham (1991) present total densities (all woody plants less than 1.5 m high) between 45–50,000 per ha for monsoon rainforest at Weipa in far north Queensland. The numbers for woody plants < 3 m high presented here for Forty Mile Scrub are between 4 and 5 times lower than in analogous vegetation at Weipa. Russell-Smith et al. (1993) record mean seedling densities (< 20 cm high) of between 2200 and 18,500 per ha in *Allosyncarpia ternata* dominated rainforest types on the Arnhem Land Plateau in the Northern Territory. These values are between 1.4 and 11.5 times higher than for seedlings (< 50 cm high) densities in Forty Mile Scrub. Weipa and the Arnhem Land Plateau study area of Russell-Smith et al. (1993) have strongly seasonal mean annual rainfalls of 2250 mm, and 1200–1550 mm pa respectively. These values are, for Weipa 2.8 times higher, and for the Arnhem Land Plateau between 1.5 and 1.9 higher than Forty Mile Scrub. These trends may indicate that seedling densities increase with mean soil moisture values in rainforest vegetation on seasonally dry substrates.

Sukumar et al. (1992) measured about 5000 stems per ha for 1–2.5 cm dbh stems in deciduous forest in southern India. Although no data are provided, they note that many species including common dominants are represented by a general lack of the smaller size classes. The decade preceding this study was marked by below average rainfall (see above) and it appears that the regeneration of many species in dry rainforest may be a phasic event. Such an event may coincide with a series of high rainfall years perhaps only once every few decades. However, the details of seedling establishment and recruitment and the rates of such processes in dry rainforest will remain a mystery until further studies are complete.

Acknowledgements

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References


Minchin, P. R. (1990) DECODA user’s manual. (Research School of Pacific Studies, Australian National University: Canberra).


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Appendix 1

Vascular plant species list for dry rainforest at Forty Mile Scrub. Species found only at disturbed edges of rainforest (i.e. along the highway) or confined to the dry rainforest ecotone are not included. Undescribed species where the bracketed reference is includes a location (e.g. Sida sp. Greenvale R.J. Fensham 1150) are recognised by BRI, other undescribed species identified simply by a collecting number (specimens are held at BRI) are awaiting confirmation of their status as distinct taxa.

f fern
h herb (non-woody plant)
v plants with long stems without intrinsic means of support
ss sub-shrub (mature plants marginally woody; less than 1m tall)
s shrub (woody; mature plants less than 3 m tall)
st small tree (woody; mature plants 3–5m tall)
t tree (woody; mature plants > 5m tall)
* exotic

PTERIDIOPHYTA
Ophioglossaceae
   Ophioglossum reticulatum f
Polypodiaceae
   Platycerium veitchii f
   Pyrosia rupestris f
Sinopteridaceae
   Cheilanthes nudiuscula f
   Cheilanthes distans f
   Cheilanthes sieberi f
   Doryopteris concolor f

GYMNOSPERMAE
Cupressaceae
   Calitris intratropica t

ANGIOSPERMAE
Acanthaceae
   Hypoestes floribunda h
   Pseudorasthænum variabile h
   Rostellaria adscendens h
Amaranthaceae
   Deeringia amaranthoides s
Anacardiaceae
   Eurosichinus falcata t
   Pleogynum timorense t
Annonaceae
   Melodorum leichhardtii t
Apiaceae
   Hydrocotyle acutiloba h
Apocynaceae
   Alyxia rusculosa s
   Carissa ovata s
   Parsonsia lanceolata v
   Parsonsia plaesiophylla v
Araliaceae
   Polycias elegans t

Asclepiadaceae
   Cryptostegia grandiflorum* v
   Cynanchum bowmanii v
   Gymnema pleiadenum v
   Sarcostemma viminal subsp. brunonianum v
   Secamone elliptica v
Asteraceae
   Ageratum conyzoides* h
   Conyza bonariensis* h
   Lagenifera sp. (R.J. Fensham 1113) h
   Olearia canescens s
   Ozothamnus cassinioides st
   Parthenium hysterophorus* h
   Vernonia cinerea h
Bignoniaceae
   Pandorea pandora v
Boraginaceae
   Cordia dichotoma st
   Ehretia membranifolia t
   Trichodesma zeylanica h
Brassicaceae
   Cardamine hirsuta h
Caesalpiniaeae
   Senna barclayana s
   Senna surattensis subsp. retusa s
   Senna surattensis subsp. surattensis s
Capparaceae
   Capparis arborea t
Celastraceae
   Cassine melanocarpa t
   Denhamia oleaster t
   Denhamia pittoporoides t
   Maytenus cunninghamii t
   Maytenus dispersa t
   Siphonodon australis t
Commelinaceae
   Commelina cyanea h
Convolvulaceae
   Ipomoea santronanensis v
Cyperaceae
   Cyperus dietrichiae h
   Cyperus gracilis h
   Cyperus isabellinus h
   Scleria macaviensis h
Ebenaceae
   Diospyros humilis t
Erythroxylaceae
   Erythroxylum australe t
Euphorbiaceae
   Antidesma parvifolium st
   Breynia oblongifolia st
   Briedelia leichhardtii st
   Claoxylon tenerifolium t
   Croton arnhemicus t
   Drypetes deplanchei t
   Fleggea leucopyrus st
   Fluggea virosa subsp. melanthesioides st
   Mallotus philippensis t
   Marginaria dubium-traceyi t
   Phyllanthus debilis*ss
   Phyllanthus similis s
   Phyllanthus novae-hollandiae t
Fabaceae
   Crotalaria verrucosa h
Hernandiaceae
   Gymnocarpus americanus t
Lamiaceae
   Plectranthus parviflorus h
Lauraceae
   Cassytha pubescens v
Lilaceae
   Dianella caerulea h
Loganiaceae
   Strychnos axillaris t
Loranthaceae
   Amyema congener h
   Dendrophoe homoplastica h
Malphigiaceae
   Rhysopterys timorensis v
Malvaceae
   Abutilon oxycarpum ss
   Abutilon indicum st
   Hibiscus sturtii ss
   Hibiscus vitifolius ss
   Malvastrum americanum ss
   Melhania brachycarpa ss
   Sida sp. (Greenvale R.J. Fensham 1150) ss
   Sida subspicata ss
Meliaceae
   Melia azedarach t
   Turraea pubescens t
Menispermaceae
   Stephania japonica v
Mimosaceae
   Acacia aulacocarpa t
Moraceae
   Ficus opposita t
   Ficus platypoda t
Myrsinaceae
   Rapania variabilis st
Myrtaceae
   Austromyrtus sp. (Forty Mile Scrub G.C. Stocker 1785) t
   Eucalyptus crebra t
   Eucalyptus erythrophloia t
   Eucalyptus tereticornis t
Oleaceae
   Notelaea microcarpa t
   Olea paniculata t
Orchidaceae
   Cymbidium canaliculatum h
   Dendrobium bowmanii h
   Dendrobium monophyllum h
   Dendrobium linguiiforme h
   Saccolabiopsis armitii h
   Sarcocilus minutiflos h
Oxalidaceae
   Oxalis perrenans h
Passifloraceae
   Passiflora foetida* v
Piperaceae
   Peperomia blanda var. floribunda h
Pittosporaceae
   Citriobatus spinescens st
   Pittosporum rhombifolium t
Plumbaginaceae
   Plumbago zeylanica h
Poaceae
   Ancistrachne uncinulata h
   Aristida gracilipes h
   Arthragrostis deschampsiioides h
   Digitaria minima h
   Lepturus sp. (Chillagoe M. Godwin C2576) h
   Opismenus aemulus h
   Panicum trichoides h
Ranunculaceae
   Clematis pickeringii v
Rhamnaceae
   Alphitonia excelsa t
Rubiaceae
   Canthium odoratum t
   Canthium sp. (R.J. Fensham 632) t
   Canthium vaccinifolium s
   Larseinaia ochreata t
   Mitracarpus hirtus h
   Pavetta australiensis st
   Psychotria daphnoides var. angustifolia st
   Spermacoce sp. (R.J. Fensham 1097) h
Rutaceae
   Acronychia laevis t
   Geijera salicifolia t
   Zanthoxylum brachyacanthum t
<table>
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<tr>
<th>Family</th>
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<td>Santalaceae</td>
<td><em>Exocarpos latifolius</em> t</td>
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<tr>
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<td><em>Santalum lanceolata</em> t</td>
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<td>Sapindaceae</td>
<td><em>Alectryon connatus</em> t</td>
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<td><em>Cupaniopsis anacardioides</em> t</td>
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<td><em>Dodonaea lanceolata</em> st</td>
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<td>Simaroubaceae</td>
<td><em>Ailanthus triphysa</em> t</td>
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<td>Smilacaceae</td>
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<td>Solanaceae</td>
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<td><em>Solanum seaforthianum</em> v*</td>
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<td><em>Solanum stelligerum</em> ss</td>
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<td>Sterculiaceae</td>
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<td><em>Waltheria indica</em> ss</td>
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<td><em>Premna acuminata</em> t</td>
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<td><em>Cissus reniformis</em> v</td>
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