

The vegetation of a mesa plateau in central Queensland

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Fensham, R.J. and Holman, J.E. (Queensland Herbarium, Department of Environment, Meiers Road, Indooroopilly, Queensland, Australia 4068) 1998. *The vegetation of a mesa plateau in central Queensland*. *Cunninghamia* 5(3) 619–631. The vegetation of a trachyte-capped, basalt mesa inaccessible to stock in central Queensland (22°40'S 148°01'E; 730 m altitude) is described by quadrat survey and floristic classification of that data. Three vegetation types are recognised: a rock pavement complex; grassland (or *Eucalyptus exserta* woodland) most frequently dominated by *Themeda triandra* on rises and mid-slopes; and *Eucalyptus microcarpa* woodland in depressions. The total flora consisted of 200 species of which 26 are restricted to small pockets of rainforest. Eleven of the species are of exotic origin, of which *Melinis repens* is particularly abundant in the grassy areas. Rare species are restricted to specialised habitat on the plateau surface. However, species such as *Themeda triandra* that are sensitive to grazing may be abundant because of the absence of stock. Despite extensive ground disturbance by pigs, Lords Table Mountain has high conservation value because of its unique combinations of vegetation and geology and refugia for species that may have been reduced in abundance in the surrounding landscape due to heavy grazing by domestic stock.

Introduction

The vegetation of central Queensland has been broadly described as part of land system mapping studies (Pedley 1967; Story 1967; Speck 1968). These works provide detail for the widespread ecosystems that have most potential for animal production, including the pastures of natural grasslands and woodlands. Very few areas of grassy vegetation in eastern Australia have never been grazed by domestic stock. Fensham and Skull (in press) described tropical woodlands enclosed by lava at the Great Basalt Wall in north Queensland that prohibit the entry of cattle. They demonstrated that one perennial grass *Capillipedium parviflorum* was a dominant where stock had been absent and was not recorded in stocked areas. However, no species were considered rare or endangered in the stock-free woodlands at the Great Basalt Wall.

The plateau of the mesa Lords Table Mountain in central Queensland (22°40'S 148°01'E; 730 m altitude) supports grassy ecosystems, but is inaccessible to domestic stock because of steep cliffs (Fig. 1). It is almost certainly one of the few areas of grassy vegetation on mainland Queensland that has never been exposed to cattle or sheep. Unlike the Great Basalt Wall, and some mesa complexes in North America (Rummell 1951; Madany and West 1983), there are no opportunities for comparison with grazed similar habitat. This paper describes the vegetation of the plateau at Lords Table Mountain and discusses features of its character in relation to other vegetation types of the region and its isolation from stock.

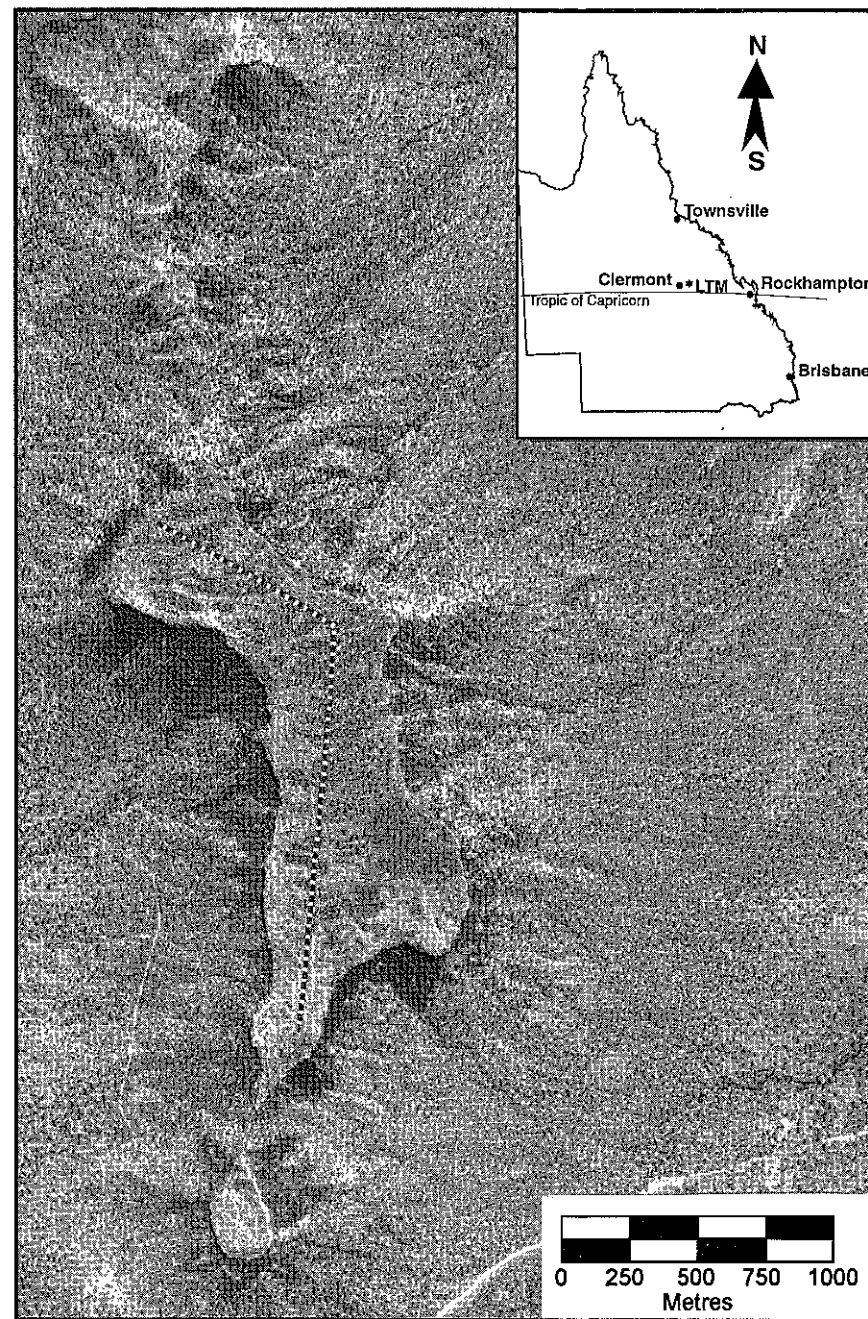


Fig. 1. Locality of Lords Table Mountain and aerial photograph of the plateau and surrounds. The location of the transect is marked. The rock pavement complex (UPGMA group 1) is not mappable at the scale of this figure. The rock pavement complex and the grassland/*Eucalyptus exserta* woodland (UPGMA group 2) comprise the light grey tone covering the majority of the area of the plateau. *Eucalyptus microcarpa* woodland (UPGMA group 3) associated with drainage depressions is distinguishable as the dark grey east-west banded pattern on the plateau surface. The dark mottled tone on the scree slopes adjoining the mesa represents dry rainforest.

Study area

Lords Table Mountain is 85 km north of the Tropic of Capricorn, 45 km ENE of Clermont (Fig. 1). It is the main feature of the Lords Table Mountain section (761 ha) of the Peak Range National Park. Mean annual rainfall at Clermont is 671 mm and is moderately seasonal with a coefficient of variation of 64.6%, with most rain falling between December and February. It lies within the Brigalow Belt North biogeographic region (Thackway & Creswell 1995).

Lords Table Mountain is a basalt mesa elevated about 320 m above the surrounding country with a plateau surface capped by trachyte covering about 140 ha (Fig. 1). The trachyte cap has provided resistance against erosion allowing this isolated mesa to survive as a rare testament to the former depth of Tertiary basalt in the district (Galloway 1967). The plateau has low relief but is intersected by shallow depressions that rapidly drain water to the east and west after rain.

The scree slopes of the plateau provide habitat for fire sensitive dry rainforest included in the survey of Fensham (1995). The basaltic foot-slopes surrounding the mesa are clothed by *Eucalyptus orgadophila* grassy woodland. While domestic stock cannot access the plateau, the presence of pigs was verified by their scratchings and common wallaroos were seen. Deer, goats or rabbits are not abundant in the region and no dung or other signs of these animals were evident.

Methods

Field methods

Sampling was conducted during April 1997 when the herbaceous flora is most easily identified. Inspection of aerial photography suggested that a transect would adequately sample the vegetation pattern and was chosen to avoid *a priori* assessment. A single transect was positioned through the middle of the long axis of the plateau (Fig. 1) and data were collected from 45 7 m × 7 m quadrats spaced at 50 m intervals.

The following data were recorded from each quadrat: a) vascular plant species present (nomenclature follows Henderson 1997) assigned to three abundance categories (1: ≤ 10 individuals; 2: > 10 but ≤ 100 individuals; 3: > 100 individuals); b) the diameter at breast height of all trees and shrubs greater than 2 m high; c) an estimate of crown cover of trees greater than 2 m high (%); d) an estimate of shrub cover (%); e) an estimate of herbaceous cover (%); f) cover of rock (%) measured along the perimeter of the quadrat; g) slope (°) measured with a clinometer; h) topographic position (rise, mid-slope, depression); i) number of pig scratchings.

An additional list was made of plant species not encountered within the quadrats and voucher specimens of most species were lodged at the Queensland Herbarium. Three soil samples from the range of perceived environments were taken along the transect at 1–5 cm depth.

Analytical methods

Data were stored and manipulated by the DECODA software (Minchin 1990). The floristic data from 45 quadrats were classified using UPGMA, a widely used polythetic, agglomerative procedure. Exploratory classifications using presence-absence data were compared with those using abundance data, at a variety of hierarchical levels, by ANOVA of the environmental variables of the generated groups. The final result was selected on the basis of its effective statistical representation and agreement with the authors' perception of vegetation pattern. The environmental variables according to the groups constituting the accepted final classification and the evaluation of differences using ANOVA is presented. The association of the groups in relation to topographic position was tested using a chi-squared test.

The pH of the soil samples was determined using a TPS meter (TPS Pty Ltd, Brisbane) and compared with unpublished data collected during a survey of the surrounding basalt landscape conducted by the senior author.

Results

A total of 200 species from 61 families was recorded on the plateau (Appendix 1). This total included 11 exotic species and 26 species that are restricted to isolated pockets of rainforest on rocky ground more representative of the vegetation of the surrounding scree slope. The orchid *Dockrillia bowmanii*, the herb *Plectranthus actites* and the shrub *Phebalium glandulosum* subsp. *eglandulosum* were restricted to the cliff tops. One hundred and forty five species were located in the quadrats.

The pH of the three soil samples from the trachyte mesa plateau ranged between 5.8 and 6.6, which is lower than the soil pH of *Eucalyptus orgadophila* woodland (mean value: 7.1; standard deviation 0.4; n=23) or grassland (mean value 7.2; standard deviation 0.4; n=78) on basaltic soils in the district.

The exploratory analysis indicated that a presence-absence classification at the three group level could be most powerfully confirmed by environmental differences and had the greatest conformity to our perception of vegetation-environment pattern. The first split of the dendrogram divided group 3 from the remainder of sites at a Bray-Curtis dissimilarity level of 0.92 and the second split divided groups 1 and 2 at a Bray-Curtis dissimilarity level of 0.69. The environmental relations of the flora are presented in Tables 1 and 2 and the percentage frequency association of the flora according to classificatory group in Appendix 1. The most salient features of these results are included in the following descriptions. Pig scratching was not significantly different between groups and had a mean density of 167 ha⁻¹ overall.

UPGMA group 1 sites are associated with rock pavements on the rises and mid-slopes of the plateau. The pavements are habitat for a suite of annuals, including *Ipomoea polymorpha* and *Tripogon loliiformis*, and resurrection ferns, *Cheilanthes distans* and *Cheilanthes sieberi* subsp. *sieberi*, and can include the succulents *Grahamia australiana*, *Portulaca bicolor* and *Portulaca filifolia* which are largely restricted to this group. The sampling strategy ensured that these limited habitats were rarely sampled in isolation

Table 1. Mean (and standard error) of variables according to UPGMA classificatory group evaluated by one way ANOVA. Means not significantly different according to Tukey's test are annotated with the same letter.

Variable	UPGMA 1	UPGMA 2	UPGMA 3	F value
Slope (°)	2.8 ^{AB} (0.6)	3.5 ^A (0.8)	0.8 ^B (0.4)	3.4*
Base rock (%)*	8.6 ^A (3.1)	2.7 ^B (1.2)	0.00 ^B (0.00)	9.8***
Pig scratches (49 m ⁻²)	1.1 ^A (0.5)	0.3 ^A (0.1)	1.4 ^A (0.4)	NS
Grass projective foliage cover (%)	52.2 ^{AB} (4.3)	66.7 ^A (1.2)	39.8 ^A (7.9)	5.6**
Shrub canopy cover (%)*	2.1 ^A (0.9)	4.7 ^A (1.2)	1.8 ^A (0.6)	NS
Tree canopy cover (%)	4.0 ^A (1.3)	14.9 ^A (3.4)	28.5 ^C (3.0)	16.9***
<i>Eucalyptus microcarpa</i> basal area (m ² .49 m ⁻²)*	0.003 ^A (0.003)	0.014 ^A (0.008)	0.093 ^B (0.031)	12.2***
<i>Eucalyptus exserta</i> basal area (m ² .49 m ⁻²)*	0.009 ^A (0.003)	0.010 ^A (0.004)	0.005 ^A (0.005)	NS
Rainforest basal area (m ² .49 m ⁻²)*	0.000 ^A (0.000)	0.002 ^B (0.001)	0.002 ^{AB} (0.001)	3.5*
Other non-rainforest basal area (m ² .49 m ⁻²)*	0.000 ^A (0.000)	0.005 ^A (0.005)	0.000 ^A (0.000)	NS
Total species richness (49 m ⁻²)	31.1 ^{AB} (1.4)	33.7 ^A (1.2)	28.2 ^B (2.0)	NS
Native species richness (49 m ⁻²)	29.1 ^{AB} (1.4)	31.4 ^A (1.1)	25.3 ^B (1.8)	4.3*
Exotic species richness (49 m ⁻²)	2.0 ^A (0.2)	2.3 ^A (0.2)	2.9 ^A (0.4)	NS
n	17	18	10	

* Transformed using log_e(x+1)

* 0.01 < P < 0.05; ** 0.001 < P < 0.01; *** P < 0.001

Table 2. Association of UPGMA classificatory groups with topographic position (Chi-square = 12.7; D.F. = 4; P < 0.025).

	UPGMA 1	UPGMA 2	UPGMA 3	Total
Rise	9	7	1	17
Mid-slope	7	6	5	18
Depression	2	1	7	10
Total	18	14	13	45

from surrounding grassland on relatively deep soil, so the classification found definition in the presence of these indicators rather than the absence of other species more akin to group 2.

UPGMA group 2 represents the grassland–low woodland (dominated by *Eucalyptus exserta*) that dominates the plateau on mid-slopes and rises that are less rocky than UPGMA group 1 (Fig. 2). The dominant grasses according to a scale of frequency of sites ($n = 18$) where they have an abundance rating of three are *Themeda triandra* (15), *Melinis repens* (10) and *Heteropogon contortus* (9). *Themeda triandra* is the same taxon as *Themeda australis* in NSW. The grasslands comprising this group are relatively species rich compared to the other groups. The grasses *Aristida queenslandica* var. *dissimilis*, *Bothriochloa ewartiana* and *Panicum effusum* are indicators of the group.

UPGMA group 3 sites are woodland dominated by *Eucalyptus microcarpa* that occurs in the depressions (Figs 1 and 3). Other faithful indicators of this group include the tree *Notelaea microcarpa*, the grasses *Bothriochloa decipiens* and *Panicum decompositum* var. *tenuius*, and the herbs *Sigesbeckia orientalis* and *Vernonia cinerea*. Projective foliage cover of grass is the lowest of all groups.



Fig. 2. Grassland dominated by *Themeda triandra* represented as UPGMA group 2 by the classification.

Discussion

Regional context

The soils on trachyte at Lords Table Mountain have lower pH values than the soils on basalt in the region. Grasslands and grassy woodlands on basalt are widespread in the region although grasslands on trachyte have not previously been recorded in the literature. The natural grass dominant of the grasslands on the basalt landscapes in the region is *Dichanthium sericeum* (Oxford land system). Grassland dominated by *Themeda triandra* has not previously been described for the Brigalow Belt North biogeographic region, although it does occur on the south-eastern edge of the Brigalow Belt South region at the Bunya Mountains (Fensham & Fairfax 1996). It does not appear that *Themeda triandra* was the natural dominant of other grasslands used as pasture in the region because it scarcely occurs on the heavy clay soils that support *Dichanthium sericeum* grassland and is still common in woodland lightly grazed by domestic stock.

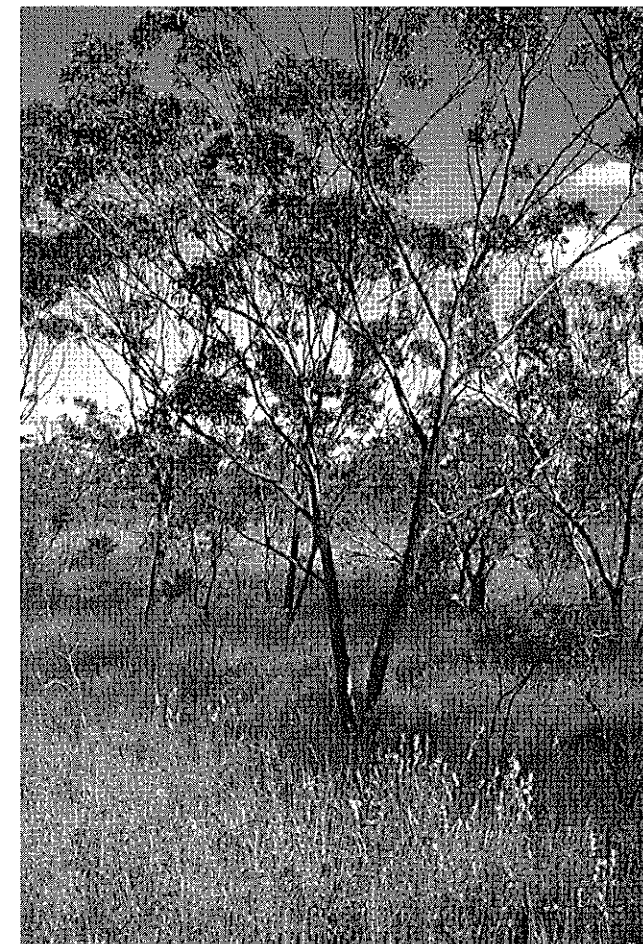


Fig. 3. Woodland dominated by *Eucalyptus microcarpa* in drainage depression represented as UPGMA group 3 by the classification.

Eucalyptus microcarpa dominates forest and woodland in southern Queensland, but the stands on Lords Table Mountain are isolated from the main distribution of the species. Texture contrast soils with acidic sub-soils provide typical habitat for *Eucalyptus microcarpa* (Land unit 28, Galloway et al. 1974) forest and woodland in southern Queensland and for similar formations dominated by its close ally *Eucalyptus moluccana* in the coastal and sub-coastal parts of both the Brigalow Belt North and South biogeographic regions (Brooker & Kleinig 1994). Vegetation dominated by either of these species occurring on igneous rocks has not previously been described (Story et al. 1967; Speck et al. 1968; Galloway et al. 1974).

Distinctive flora

The Queensland Herbarium database HERBRECS was used to search for species collected on Lords Table Mountain that may be rare in the region. The recently described *Plectranthus actites* is only known from this site (Forster 1994). The taxonomic status of *Callistemon* sp. (Ropers Peak, P.I. Forster PIF7208) is uncertain, but it may be restricted to range country in central Queensland. The graminaceous fern *Isoetes muelleri* and the succulent *Grahamia australiana* are the only species, recorded outside the rainforest or cliff-top habitats, that may be rare within the region. *Isoetes* is an ephemeral that appears only briefly after rain and may in fact be rare in time rather than space. Both *Isoetes* and *Grahamia* are restricted to specialised habitats, rocky depressions and rock pavements respectively.

There were no species at Lords Table Mountain abundant in the stock-free vegetation, but largely eradicated from the grazed landscape, i.e. equivalent to *Capillipedium* at the Great Basalt Wall. However, relative species abundances have undoubtedly been altered as a result of heavy total grazing pressure. The known grazing sensitivity of *Themeda triandra* (McIvor & Scanlan 1994) and its dominance in the herbaceous understoreys of UPGMA group 2 is suggestive of light grazing by native herbivores on Lords Table Mountain.

The total number of exotics (5.5% of species) recorded at Lords Table Mountain was relatively small, but the second most abundant species in the grassy understoreys was the southern African grass *Melinis repens*. The plumed seed of the species provides effective dispersal and pig scratching may provide the bare ground that favours the establishment of this species. Fensham and Skull (in press) demonstrated that *Melinis repens* was favoured in the cattle-free woodland at the Great Basalt Wall. This result together with its abundance at Lords Table Mountain suggest that it may be sensitive to grazing despite having low productive value as a mature plant (Tohill & Hacker 1973).

Lords Table Mountain includes combinations of vegetation and geology that are probably absent elsewhere in the region. It is further unique because it is ungrazed by domestic stock, although the ground is extensively disturbed by pigs. The mesa has high conservation value and the plateau and its surrounds are a valuable asset within Queensland's National Park estate.

Acknowledgments

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Appendix 1 Percentage frequency of species according to UPGMA classificatory group. Species recorded from the plateau top, but not within quadrats are included without frequency values. Nomenclature follows that accepted at Queensland Herbarium.

	UPGMA group				UPGMA group		
	1	2	3		1	2	3
PTERIDOPHYTES				<i>Epaltes australis</i>			
Isoetaceae				<i>Glossocardia bidens</i>	5.9	-	-
<i>Isoetes muelleri</i>				<i>Parthenium hysterophorus</i> ¹	5.9	11.1	20.0
Ophioglossaceae				<i>Peripleura hispidula</i> subsp. <i>hispidula</i>	88.2	44.4	-
<i>Ophioglossum gramineum</i>				<i>Ptercaulon sphacelatum</i>	-	-	10.0
Sinopteridaceae				<i>Schkuria pinnata</i> var. <i>abrotanoides</i> ¹	5.9	-	-
<i>Cheilanthes distans</i>	94.1	11.1	10.0	<i>Sigesbeckia orientalis</i> ¹	17.7	27.8	80.0
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	88.2	33.3	-	<i>Tagetes minima</i> ¹	5.9	-	-
<i>Doryopteris concolor</i>	5.9	-	-	<i>Vernonia cinerea</i>	11.8	16.7	60.0
ANGIOSPERMEAE				<i>Vittadinia pterochaeta</i>	29.4	33.3	-
Acanthaceae				<i>Vittadinia sulcata</i>	11.8	5.6	-
<i>Brunoniella australis</i>	5.9	77.8	90.0	Bignoniaceae			
<i>Pseuderanthenum variabile</i>	-	-	20.0	<i>Pandorea pandorana</i>	5.9	5.6	-
Amaranthaceae				Boraginaceae			
<i>Achyranthes aspera</i>				<i>Heliotropium brachygynae</i>	35.3	16.7	-
<i>Alternanthera denticulata</i>	-	-	40.0	Cactaceae			
<i>Alternanthera nana</i>	5.9	-	10.0	<i>Opuntia stricta</i> ¹	52.9	33.3	70.0
Anacardiaceae				<i>Opuntia tomentosa</i> ¹	11.8	61.1	60.0
<i>Euroschinus falcata</i>	5.9	11.1	-	Caesalpiniaceae			
Apocynaceae				<i>Chamaecrista absus</i>	47.1	72.2	30.0
<i>Alstonia constricta</i>	-	11.1	-	<i>Chamaecrista mimosoides</i>	58.8	27.8	-
<i>Alyxia ruscifolia</i>	11.8	16.7	10.0	<i>Senna surratensis</i> subsp. <i>retusa</i>			
<i>Carissa ovata</i>	-	5.6	-	Campanulaceae			
<i>Parsonsia lanceolata</i> ²				<i>Lobelia quadrangularis</i>	23.5	55.6	60.0
<i>Parsonsia plaesiophylla</i> ²				<i>Wahlenbergia gracilis</i>	88.2	55.6	-
Araliaceae				Capparaceae			
<i>Polyscias elegans</i> ²				<i>Capparis arborea</i> ²			
Asclepiadaceae				Celastraceae			
<i>Hoya australis</i> ²				<i>Maytenus disperma</i>	-	-	20.0
<i>Marsdenia microlepis</i>	5.9	11.1	20.0	Clusiaceae			
<i>Marsdenia viridiflora</i>	-	-	20.0	<i>Hypericum gramineum</i>			
<i>Secamone elliptica</i>	5.9	5.6	20.0	Commelinaceae			
Asteraceae				<i>Commelina cyanea</i>	17.7	44.4	40.0
<i>Acmella grandiflora</i> var. <i>brachyglossa</i>	-	-	30.0	Convolvulaceae			
<i>Bidens bipinnata</i> ¹	17.7	55.6	50.0	<i>Dichondra repens</i>	-	5.6	-
<i>Brachyscome microcarpa</i>	5.9	-	-	<i>Evolvulus alsinoides</i>	76.5	66.7	50.0
<i>Bracteantha bracteata</i>	47.1	38.9	-	<i>Ipomoea plebeia</i>	35.3	55.6	40.0
<i>Chrysocephalum apiculatum</i>				<i>Ipomoea polymorpha</i>	82.4	33.3	-

	UPGMA group				UPGMA group		
	1	2	3		1	2	3
Crassulaceae				Goodeniaceae			
<i>Bryophyllum tubiflorum</i> ¹				<i>Goodenia grandiflora</i>			
Cyperaceae				Juncaceae			
<i>Cyperus bifax</i>	-	5.6	40.0	<i>Juncus aridicola</i>	-	5.6	40.0
<i>Cyperus conicus</i>	-	-	10.0	Lamiaceae			
<i>Cyperus difformis</i>				<i>Plectranthus actites</i> ³	-	16.7	-
<i>Cyperus fulvus</i>	-	11.1	30.0	Liliaceae			
<i>Cyperus gracilis</i>	-	-	30.0	<i>Dianella caerulea</i>	58.8	55.6	100.0
<i>Cyperus squarrosus</i>	-	5.6	10.0	<i>Hypoxis hygrometrica</i> var. <i>villosisepala</i>	52.9	50.0	30.0
<i>Fimbristylis dichotoma</i>	88.2	88.9	80.0	<i>Iphigenia indica</i>	35.3	22.2	10.0
<i>Liphocarpa microcephala</i>				<i>Tricoryne elatior</i>	11.8	5.6	-
<i>Scleria mackaviensis</i>	11.8	33.3	-	Lythraceae			
Droseraceae				<i>Ammania multiflora</i>			
<i>Drosera indica</i>				<i>Rotala mexicana</i>			
Ebenaceae				Malvaceae			
<i>Diospyros humilis</i>	-	-	20.0	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>			
Erythroxylaceae				<i>Hibiscus sturtii</i>	5.9	16.7	-
<i>Erythroxylum australe</i> ²				<i>Hibiscus trionum</i>	11.8	-	10.0
Euphorbiaceae				<i>Malvastrum americanum</i> ¹			
<i>Acalypha eremorum</i> ²				<i>Sida spinosa</i>	-	16.7	20.0
<i>Breynia oblongifolia</i>	5.9	11.1	20.0	<i>Sida subspicata</i>	5.9	22.2	-
<i>Briedela leichhardtii</i> ²				<i>Sida</i> sp. (Greenvale R.J. Fensham 1150) ²			
<i>Drypetes deplanchei</i> ²				Meliaceae			
<i>Euphorbia drummondii</i>	-	5.6	-	<i>Melia adzedarach</i> ²			
<i>Euphorbia tannensis</i>	29.4	11.1	-	Menispermaceae			
<i>Flueggea leucopyrus</i>	-	-	10.0	<i>Tinospora smilacina</i>	-	-	10.0
<i>Phyllanthus virgatus</i>	58.8	66.7	30.0	Mimosaceae			
<i>Poranthera microphylla</i>	11.8	-	-	<i>Acacia decora</i>	23.5	-	-
Fabaceae				<i>Neptunia gracilis</i>	-	11.1	10.0
<i>Crotalaria incana</i> ¹				Moraceae			
<i>Crotalaria juncea</i>	41.2	50.0	10.0	<i>Ficus obliqua</i> subsp. <i>petiolaris</i> ²			
<i>Desmodium gunnii</i>	-	-	10.0	<i>Ficus opposita</i> ²			
<i>Desmodium rhytidophyllum</i>	17.7	5.6	20.0	<i>Ficus virens</i> ²			
<i>Desmodium varians</i>	-	5.6	-	Myrtaceae			
<i>Galactia tenuiflora</i>	35.3	50.0	-	<i>Austromyrtus bidwillii</i> ²			
<i>Glycine tabacina</i>	11.8	33.3	10.0	<i>Callistemon</i> sp. (Ropers Peak, Pl. Forster PIF7208)	-	16.7	20.0
<i>Glycine tomentella</i>	23.5	38.9	10.0	<i>Eucalyptus exserta</i>	47.1	67.7	30.0
<i>Indigastrum parviflorum</i>	-	5.6	-	<i>Eucalyptus microtheca</i>	23.5	27.8	100.0
<i>Indigofera hirsuta</i>	5.9	11.1	-	Oleaceae			
<i>Indigofera linnaei</i>	17.7	11.1	10.0	<i>Jasminum didymum</i> ²			
<i>Rhynchosia minima</i>							
<i>Tephrosia filipes</i>	35.3	11.1	-				
<i>Zornia muriculata</i> subsp. <i>muriculata</i>	23.5	22.2	-				

	UPGMA group				UPGMA group		
	1	2	3		1	2	3
<i>Jasminum simplicifolium</i>				<i>Microlaena stipoides</i> ²			
<i>Notelaea microcarpa</i>	11.8	33.3	90.0	<i>Oplismenus aemulus</i> ²			
Orchidaceae				<i>Panicum decompositum</i>			
<i>Dockrillia bowmanii</i> ³				var. <i>tenuius</i>	5.93	3.37	0.0
Oxalidaceae				<i>Panicum effusum</i>	52.9	100.0	50.0
<i>Oxalis corniculata</i>	58.8	55.6	20.0	<i>Panicum queenslandicum</i>	-	-	10.0
Pittosporaceae				<i>Paspalidium constrictum</i>	41.2	66.7	30.0
<i>Citriobatus spinescens</i>	-	22.2	-	<i>Sorghum leiocladum</i>	-	5.6	-
Poaceae				<i>Sporobolus elongata</i>	5.9	11.1	50.0
<i>Alloteropsis cimicina</i>	29.4	22.2	-	<i>Themeda triandra</i>	100.0	100.0	80.0
<i>Ancistrachne uncinulata</i> ²				<i>Tragus australiensis</i>	29.4	22.2	-
<i>Aristida calycina</i> var. <i>calycina</i>	5.9	-	-	<i>Tripogon loliiformis</i>	70.6	27.8	-
<i>Aristida latifolia</i>	-	-	20.0	Polygalaceae			
<i>Aristida lazardis</i>	11.8	50.0	10.0	<i>Polygala linariifolia</i>	41.2	55.6	20.0
<i>Aristida leptopoda</i>	-	-	10.0	Portulacaceae			
<i>Aristida muricata</i>	23.5	5.6	-	<i>Grahamia australiana</i>	17.7	5.6	-
<i>Aristida queenslandica</i>				<i>Portulaca bicolor</i>	11.8	-	-
var. <i>dissimilis</i>	29.4	61.1	30.0	<i>Portulaca filifolia</i>	17.7	-	-
<i>Aristida ramosa</i>	-	11.1	-	Proteaceae			
<i>Aristida spuria</i>	52.9	5.6	-	<i>Hakea lorea</i>	5.9	-	-
<i>Bothriochloa bladhii</i>	5.9	27.8	40.0	Rhamnaceae			
<i>Bothriochloa decipiens</i>	-	27.8	70.0	<i>Alphitonia excelsa</i>			
<i>Bothriochloa ewartiana</i>	23.5	61.1	20.0	Rubiaceae			
<i>Brachiaria foliosa</i>				<i>Canthium odoratum</i> ²			
<i>Brachiaria holosericea</i>	17.7	5.6	-	<i>Canthium</i> sp. (Duaringa, N.H. Speck 1819)	47.1	66.7	40.0
<i>Chloris divaricata</i>	-	-	10.0	<i>Oldenlandia coerulescens</i>	23.5	5.6	-
<i>Chrysopogon fallax</i>	41.2	27.8	40.0	<i>Oldenlandia galioides</i>			
<i>Cymbopogon oblectus</i>	82.4	61.1	10.0	<i>Oldenlandia mitrasacmoides</i>			
<i>Cymbopogon queenslandicus</i>	11.8	-	-	subsp. <i>trachymenoides</i>			
<i>Cymbopogon refractus</i>	-	27.8	30.0	<i>Spermacoce</i> sp. (R.J. Fensham 3177)	52.9	22.2	20.0
<i>Dichanthium sericeum</i>				Rutaceae			
subsp. <i>humilis</i>	70.6	55.6	20.0	<i>Acronychia laevis</i> ²			
<i>Digitaria brownii</i>	-	33.3	40.0	<i>Geijera salicifolia</i> ²			
<i>Digitaria divaricatissima</i>	11.8	27.8	-	<i>Phebalium glandulosum</i>			
<i>Enneapogon gracilis</i>	23.5	5.6	-	subsp. <i>eglandulosum</i> ³			
<i>Enneapogon lindleyanus</i>	29.4	50.0	-	Santalaceae			
<i>Eragrostis elongata</i>	-	-	20.0	<i>Exocarpos latifolius</i> ²			
<i>Eragrostis sororia</i>	5.9	5.6	20.0	Sapindaceae			
<i>Eriachne mucronata</i>	5.9	-	-	<i>Alectryon connatus</i> ²			
<i>Eriochloa procera</i>	-	5.6	60.0	<i>Dodonaea viscosa</i>	82.4	94.4	100.0
<i>Eulalia aurea</i>	5.9	-	-	Sapotaceae			
<i>Heteropogon contortus</i>	94.1	77.8	60.0	<i>Planchonella cotinifolia</i> ²			
<i>Iseilema vaginiflorum</i>	-	-	10.0				
<i>Leptochloa decipiens</i>	-	-	50.0				
<i>Melinis repens</i> ¹	100.0	94.4	60.0				

	UPGMA group		
	1	2	3
Scrophulariaceae			
<i>Stemodia glabella</i>			
Smilacaceae			
<i>Eustrephus latifolius</i>	5.9	33.3	10.0
Solanaceae			
<i>Solanum ellipticum</i>	-	11.1	-
Sterculiaceae			
<i>Brachychiton australis</i>			
<i>Brachychiton populneus</i>	-	11.1	-
<i>Brachychiton rupestris</i>			
Tiliaceae			
<i>Grewia latifolia</i>	-	5.6	-
Verbenaceae			
<i>Clerodendrum floribundum</i>			
Violaceae			
<i>Hybanthus stellarioides</i>	35.3	33.3	10.0
Vitaceae			
<i>Cayratia clematidea</i>	-	11.1	-
<i>Cissus oblonga</i>	11.8	16.7	-
<i>Cissus opaca</i> ²			
Xanthorrhoeaceae			
<i>Lomandra longifolia</i>	-	11.1	-

¹ exotic species

² restricted to rainforest habitat

³ restricted to cliff top habitat