

Native and exotic flora of the North Western Slopes upstream of the junction of the Peel and Namoi Rivers, New South Wales

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*Hosking¹, J.R. and T.A. James² (¹ NSW Agriculture and CRC for Weed Management Systems, RMB 944, Tamworth, NSW 2340; ²National Herbarium of New South Wales, Royal Botanic Gardens Sydney, Mrs Macquaries Road, Sydney, NSW 2000) 1998. Native and exotic flora of the North Western Slopes upstream of the junction of the Peel and Namoi Rivers, New South Wales. *Cunninghamia* 5(3): 721–766.* The area covered by this study is in the North Western Slopes botanical subdivision of New South Wales, upstream of the junction of the Peel and Namoi Rivers (between 30°16'S and 31°35'S and 150°21'E and 151°22'E). Detailed surveys were carried out in eight areas on a range of soils. A total of 1041 taxa (1016 species) were recorded (639 native to the area, 8 Australian but not native to the area, 394 exotic and naturalised). Data were analysed to provide relative proportions of native and exotic plant taxa in relation to plant groups, plant families, survey sites, and life-form and life-cycle attributes. A high proportion of exotic taxa (38%) was recorded, particularly in the plant families Poaceae, Asteraceae and Fabaceae, reflecting a long history of settlement and agriculture in the region. A diversity of life-forms was represented but overall the taxa were predominantly forbs, grasses or grass-like plants. The area around Woodsreef asbestos mine and an area east of Chaffey Dam contained a number of native species that appeared to be restricted to serpentinite areas. The threat of invasion and replacement of native species by exotic species is a serious problem in the study area. The only conservation reserves are found in dissected country on the eastern side, the largest being Warrabah National Park which recorded the highest number of native taxa (351). The authors know of no fertile, gently-sloping areas which have not been modified by many years of grazing or cropping. In these areas the least disturbed native vegetation is found along some stock routes and roadsides. A more comprehensive reserve system is clearly needed to protect the range of vegetation communities existing in the study area.

Introduction

The aim of this study is to improve documentation of the North Western Slopes flora upstream of the junction of the Peel and Namoi Rivers, and to analyse and compare the native and exotic flora of this region. The study area is in the south-eastern corner of the North Western Slopes botanical subdivision which extends from the Queensland border west of Tenterfield south-west to the Warrumbungles. The only previously published flora for a location in the study area covers Oxley Park, Tamworth (Hosking 1990, 1991). Jurjens (1974) lists some of the species found in the Tamworth-Nundle-'Head of Peel' area in the southern part of this study. Williams (1979) lists plants recorded in pastures of the North Western Slopes. White et al. (1990) studied vegetation which would be flooded by an enlargement of Chaffey Dam and listed some of the species found in the southern part of this study and at site 8 listed

below. Our study updates the Oxley Park list and provides floristic records at seven other sites. Documentation is fundamental to improving our knowledge of the frequency and distribution of native and exotic plant taxa, with important practical applications in many aspects of vegetation management.

The study area

The study area is approximately 620 000 ha situated to the north of Sydney and west of the Great Dividing Range (Fig. 1). Larger towns in this area, from north to south, are Barraba, Manilla, Tamworth and Nundle. The area varies in altitude from about 290 m above sea level (asl) at the junction of the Peel and Namoi Rivers to around 950 m asl on some of the higher peaks such as Black Jack Mountain about 6 km north west of Chaffey Dam.

The climate is similar to that of Tamworth (described in Hosking 1990). Over the survey area it is generally warmer moving from east to west and wetter moving toward the mountains on the eastern boundary and south towards Nundle. Table 1 shows long term average rainfall for Barraba, Manilla, Tamworth and Nundle, and long term average temperatures (maximum and minimum) for Barraba and Tamworth.

Table 1. Mean monthly rainfall and temperature for selected stations on the North Western Slopes of New South Wales.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Barraba†	87	77	57	39	43	47	44	40	44	63	72	74	687
Manilla*	91	68	56	40	42	45	42	40	40	59	65	74	658
Tamworth†	85	66	49	41	43	50	45	46	48	60	67	71	671
Nundle*	98	79	59	50	56	75	70	68	64	78	79	93	864
Temperature (°C)													
Barraba†													
(Max.)	31.2	30.9	28.8	25.2	20.2	16.6	15.9	17.7	20.7	24.5	27.6	30.6	24.2
(Min.)	16.3	16.0	12.8	7.7	4.0	1.5	-0.1	1.3	4.0	8.2	11.3	14.3	8.1
Tamworth†													
(Max.)	31.0	30.8	28.6	24.8	19.6	16.3	15.2	17.0	20.3	24.2	27.7	30.3	23.8
(Min.)	17.4	17.2	15.0	11.2	7.2	4.6	3.1	4.3	6.6	10.3	13.4	16.1	10.5

† Based on Anon. (1988)

* From MetAccess © CSIRO — Manilla Post Office readings from 1883–1994, Nundle Post Office readings from 1890–1992.

The most widespread plant communities in the area were originally *Eucalyptus* woodlands but, following settlement in the late 1820s and early 1830s, there was clearing for sheep and cattle grazing (Milliss 1980). More recently the gently sloping to flat areas have been cultivated for winter and summer crops.

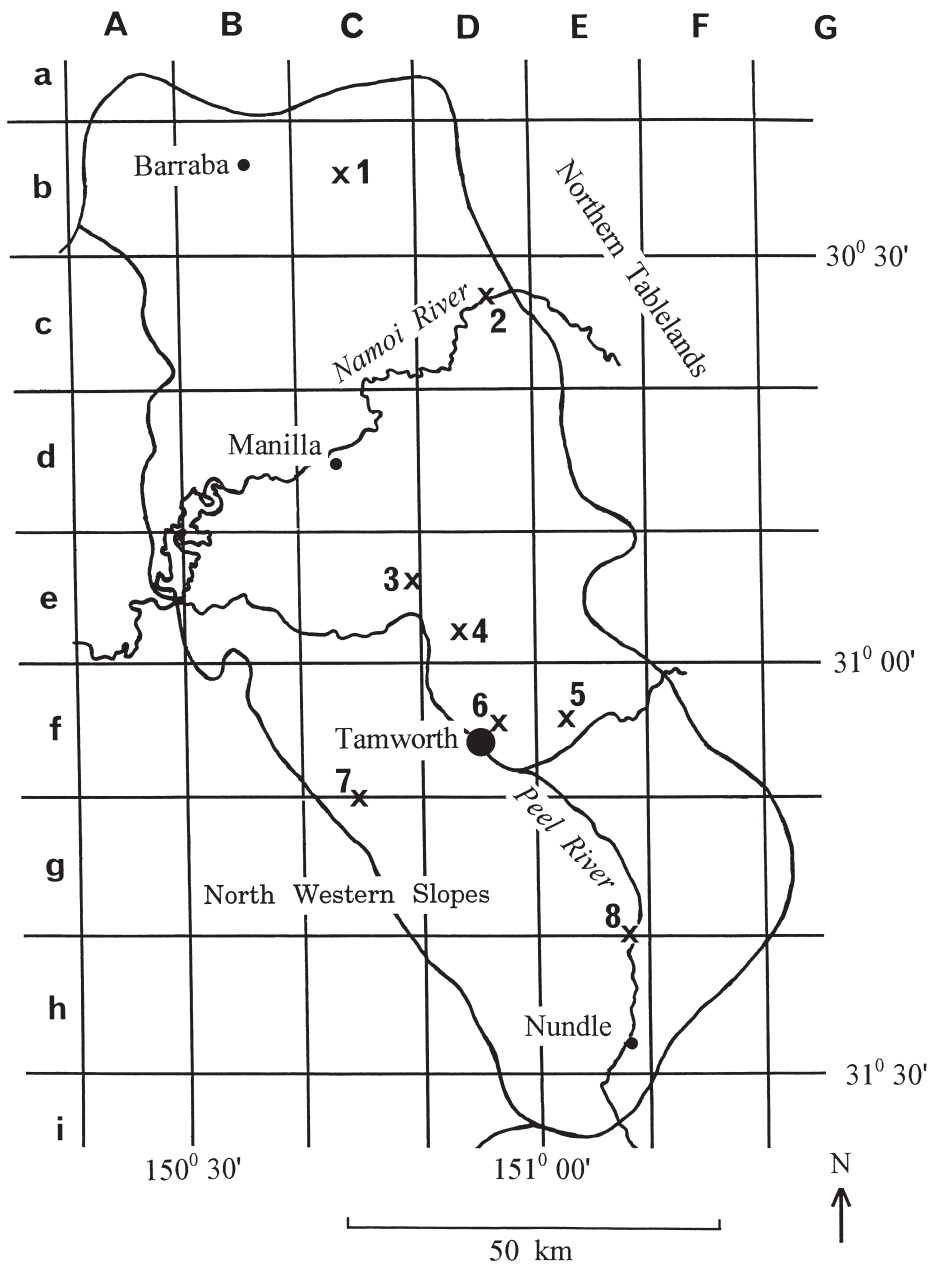


Fig. 1. Map of the study area upstream of the junction of the Peel and Namoi Rivers. Detailed survey sites are listed 1 to 8 with sites of other collections listed Aa to Ei.

Methods

Eight sites, on a range of substrates and soils, were selected for detailed survey. Ease of access was a factor in site choice. Sites were of variable size because some of the substrates occurred as small outcrops. In one case an area alongside a road was used, as such areas are the only ones where relatively undisturbed native vegetation can be found on black cracking clay soil. Surveys were carried out to determine which species were present at each site and involved detailed searches of as much of each site as was possible. Fixed quadrats were not used as this would have missed many of the less widespread species. Collections outside the eight primary sites were only made on an ad hoc basis. If a number of species not encountered at the eight detailed study sites was found at any other location then this location was also visited on a number of occasions. For this reason a number of visits were made to wet gullies south-east of Chaffey Dam, a serpentinite area east of Chaffey Dam and a roadside area near Klori (west of Attunga Rubbish Tip). Species recorded were those native to the area or species that have become naturalised.

The flora lists for Oxley Park, Attunga State Forest and Warrabah National Park were largely compiled between January 1984 and March 1997. The area near Kootingal was surveyed from April 1989 and the other four sites from August 1992. Sampling was carried out during all seasons.

Specimens of most taxa were sent to the National Herbarium of New South Wales (NSW) for confirmation. Many of these specimens have been retained by NSW and duplicates are held at the Tamworth Agricultural Research Centre Herbarium. Further specimens have been lodged at the New England Herbarium (NE), the Australian National Herbarium (CANB) and the National Herbarium of Victoria (MEL). Lodging of voucher specimens at these herbaria is essential in view of ongoing taxonomic research and reviews.

Each species was assessed for life form, origin (native or exotic) and life cycle (for more details see Table 2) and the information was entered into a Microsoft Access database for data manipulation.

Study sites

Sites studied in detail are described below. Plant communities described follow those of Specht (1970) and are those presently on the sites.

1. Woodsreef asbestos mine

The area of this site (between 30°23'S and 30°26'S and 150°43'E and 150°45'E) covered approximately 150 ha around Woodsreef asbestos mine. Altitude varied from 465 m to 600 m. There has been little disturbance between the road, on the eastern side, and the open cut mine. This area does not appear to have been grazed for many years (Fig. 2). Grazing occurs to the west of the mine but this decreases with distance from Ironbark Creek and with increasing steepness of slopes. Soil in the survey area is predominantly derived from serpentinite. Vegetation is mainly grassy woodland. The dominant tree species in the area is a stringybark, *Eucalyptus* sp. (previously confused with *Eucalyptus*



Fig. 2. Woodland of *Eucalyptus* sp. (unnamed stringybark) with scattered *Angophora floribunda* near Woodsreef asbestos mine (Site 1).

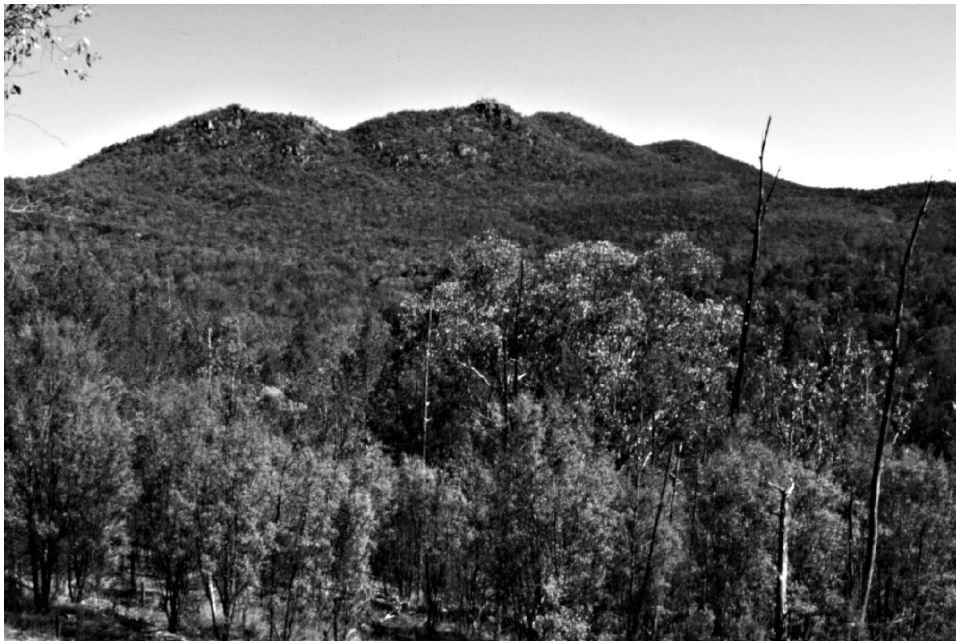


Fig. 3. Warrabah National Park mainly consists of woodland to open-forest communities dominated by *Callitris glaucophylla* and *Eucalyptus* species (Site 2).

macrorhyncha). Scattered trees of *Angophora floribunda* also occur in this area and *Xanthorrhoea glauca* is locally common south of the mine. The shrub understorey is commonly sparse and the ground flora is dominated by perennial grasses such as *Aristida ramosa*. One area east of the mine consists of a north-facing slope dominated by *Triodia scariosa*. The survey included sampling along Ironbark Creek where soils are derived from a mixture of serpentinite, basalt, jasper and quartz.

Table 2 Species list for North Western Slopes upstream of the junction of the Peel and Namoi Rivers.

Nomenclature follows Harden (1990–93) except where indicated.

Before the species

* exotic species

† native species which is probably not, or definitely not, native to this area

‡ species not recorded as present in the North Western Slopes in Harden (1990–93)

Life form

C = climber or creeper

E = epiphyte

e = epilith (plants growing on rocks)

F = forb

G = grasses

GL = grass-like

HP = hemiparasite

LS = low shrub (< 2 m high)

P = parasite

Pt = Pteridophyte

TS = tall shrub (> 2 m high)

T = tree

Life cycle

AN = annual

PA = perennial bulb with annual shoots

PE = perennial

SP = short-lived perennial

Site

1 = Woodsreef asbestos mine

2 = Warrabah National Park

3 = Attunga rubbish tip

4 = Attunga State Forest

5 = Kootingal

6 = Oxley Park, Tamworth

7 = Duri

8 = Chaffey Dam

Other = areas correspond to grids shown on Fig. 1.

v = a plant specimen from this site was checked by NSW, some have been retained by NSW and others are often located at other herbaria (see text).

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
PTERIDOPHYTES											
ADIANTACEAE											
<i>Adiantum aethiopicum</i>	Pt	PE	-	2	-	4	5	6v	-	8	
<i>Adiantum hispidulum</i>	Pt	PE	-	2v	-	4v	5	-	-	-	
ASPLENIACEAE											
<i>Asplenium flabellifolium</i>	Pt	PE	1	2v	-	4v	5	6v	-	8	
<i>Pleurosorus subglandulosus</i>	Pt	PE	-	2v	-	4v	5	-	-	8	
AZOLLACEAE											
<i>Azolla filiculoides</i> var. <i>rubra</i>	Pt	PE	1	2v	-	-	-	-	-	8	
BLECHNACEAE											
<i>Doodia media</i> subsp. <i>media</i>	Pt	PE	-	2v	-	-	-	-	-	-	
DENNSTAEDTIACEAE											
<i>Pteridium esculentum</i>	Pt	PE	-	-	-	-	-	6v	-	8	
DRYOPTERIDACEAE											
<i>Polystichum fallax</i>	Pt	PE	-	-	-	-	-	-	-	-	Ehv
MARSILEACEAE											
<i>Marsilea drummondii</i>	Pt	AN	-	2v	-	-	-	-	-	-	
POLYPODIACEAE											
<i>Pyrrosia confluens</i>	E,e,Pt	PE	-	-	-	-	-	-	-	-	Ehv
<i>Pyrrosia rupestris</i>	E,e,Pt	PE	-	-	-	-	-	-	-	8v	
PTERIDACEAE											
<i>Pteris tremula</i>	Pt	PE	-	2v	-	-	-	-	-	8v	
SINOPTERIDACEAE											
<i>Cheilanthes distans</i>	Pt	PE	1	2v	3	4v	5	6v	-	8	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Pt	PE	1	2v	3	4	5	6v	-	8	
<i>Pellaea falcata</i> var. <i>falcata</i>	Pt	PE	-	2	-	4	5	6v	-	8	
TAENITIDACEAE											
<i>Anogramma leptophylla</i>	Pt	AN	-	2v	-	-	-	-	-	-	
CYCADS											
ZAMIACEAE											
<i>Macrozamia stenomera</i>	LS	PE	-	2v	-	4v	-	6v	-	-	
CONIFERS											
CUPRESSACEAE											
<i>Callitris endlicheri</i>	T	PE	-	2v	-	-	-	-	-	-	
<i>Callitris glaucophylla</i>	T	PE	1	2	3	4	5	6v	-	-	
‡* <i>Sabina virginiana</i>	T	PE	-	-	-	-	-	6v	-	-	
MONOCOTYLEDONS											
AGAVACEAE											
* <i>Agave americana</i>	TS	PE	-	-	-	4	-	-	-	-	
ALLIACEAE											
* <i>Nothoscordum borbonicum</i>	GL	PA	-	2	-	-	-	6v	-	8	
AMARYLLIDACEAE											
<i>Crinum flaccidum</i>	GL	PA	-	-	3v	-	5	-	-	-	
‡* <i>Narcissus tazetta</i>	GL	PA	-	-	-	-	-	-	-	-	Ehv
‡* <i>Narcissus tazetta</i> 'double'	GL	PA	-	-	-	-	-	-	-	-	Ehv
ANTHERICACEAE											
<i>Arthropodium minus</i>	GL	PA	1	2	3	4v	5	6v	7	8	
<i>Arthropodium</i> sp. B	GL	PA	1	2	3	4	5	6v	-	8v	
<i>Caesia calliantha</i>	GL	PA	-	-	-	-	-	-	7v	-	
<i>Dichopogon fimbriatus</i>	GL	PA	-	2	3	4	5	6v	7	8	
<i>Laxmannia gracilis</i>	GL	PA	1v	2v	-	-	-	-	-	-	
<i>Thysanotus tuberosus</i>	GL	PA	1v	-	-	-	-	6	-	-	
<i>Tricoryne elatior</i>	GL	PA	1v	2v	-	-	-	-	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
ARECACEAE											
‡* <i>Phoenix canariensis</i>	T	PE	-	-	-	4	-	6v	-	-	
ASPARAGACEAE											
* <i>Asparagus asparagoides</i> (= <i>Myrsiphyllum asparagoides</i>)	C	PA	-	-	-	-	-	6v	-	-	
‡* <i>Asparagus densiflorus</i> (= <i>Protasparagus aethiopicus</i>)	F	PA	-	-	-	-	-	6	-	-	
* <i>Asparagus officinalis</i>	F	PA	1	-	-	-	-	6v	-	-	
ASPHODELACEAE											
* <i>Aloe saponaria</i>	F	PE	-	-	-	-	-	6v	-	-	
* <i>Asphodelus fistulosus</i>	GL	SP	1	-	3	4	-	6v	7	-	
‡ <i>Bulbine alata</i>	GL	AN	-	-	-	-	-	-	-	-	Bdv
<i>Bulbine bulbosa</i>	GL	PE	-	2	3	4v	-	6v	7	8	
<i>Bulbine semibarbata</i>	GL	AN	-	-	-	4v	-	-	-	-	
CENTROLEPIDACEAE											
<i>Centrolepis strigosa</i>	GL	AN	-	2v	-	-	-	-	-	-	
COLCHICACEAE											
<i>Wurmbea biglandulosa</i>	GL	PA	1v	2v	3	4v	5	6v	-	8	
COMMELINACEAE											
<i>Commelina cyanea</i>	F	PE	1v	2	-	4	5	6v	-	8v	
<i>Murdannia graminea</i>	GL	PA	-	2v	-	-	-	-	-	-	
* <i>Tradescantia albiflora</i>	F	PE	-	-	-	-	-	6v	-	-	
* <i>Tradescantia zebrina</i>	F	PE	-	-	-	-	-	6v	-	-	
CONVALLARIACEAE											
‡* <i>Liriope</i> (possibly <i>L. muscari</i>)	GL	PA	-	-	-	-	-	6v	-	-	
CYPERACEAE											
‡ <i>Bolboschoenus fluviatilis</i>	GL	PE	-	-	-	-	-	-	-	-	Bev
‡ <i>Bolboschoenus medianus</i>	GL	PE	-	2	-	-	-	-	-	-	Dfv
<i>Bulbostylis barbata</i>	GL	AN	-	2v	-	-	-	-	-	-	
<i>Carex appressa</i>	GL	PE	1v	2v	-	4	-	-	-	8v	
<i>Carex breviculmis</i>	GL	PE	1v	2v	-	-	-	-	-	8v	
<i>Carex fascicularis</i>	GL	PE	-	-	-	-	-	-	-	8v	
<i>Carex inomitata</i>	GL	PE	1	2	-	4	-	6v	-	8	
<i>Carex inversa</i>	GL	PE	1	2	3	4v	5	6v	7v	8	
‡ <i>Carex longebrachiata</i>	GL	PE	-	-	-	-	-	-	-	-	Eiv
<i>Carex polyantha</i>	GL	PE	-	2v	-	-	-	-	-	-	
* <i>Cyperus aggregatus</i>	GL	AN	-	-	-	-	5v	-	-	-	
<i>Cyperus concinnus</i>	GL	PE	1v	-	-	4v	-	-	-	-	
<i>Cyperus difformis</i>	GL	AN	-	2v	-	4	-	-	-	8v	
* <i>Cyperus eragrostis</i>	GL	PE	-	2v	-	-	5	-	-	8	
<i>Cyperus exaltatus</i>	GL	PE	-	2v	-	-	-	-	-	-	
‡* <i>Cyperus flavescens</i>	GL	AN	1v	-	-	-	-	-	-	-	
<i>Cyperus flavidus</i>	GL	SP	1v	-	-	4v	-	-	-	8	
<i>Cyperus fulvus</i>	GL	PE	1v	2v	-	4	5	-	-	-	
<i>Cyperus gracilis</i>	GL	PE	1	2	3	4	5	6v	-	8	
<i>Cyperus gunnii</i> subsp. <i>gunnii</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Cyperus lhotskyanus</i>	GL	PE	1v	2v	-	-	-	-	-	-	
<i>Cyperus lucidus</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Cyperus polystachyos</i>	GL	SP	1v	-	-	-	-	-	-	-	
‡ <i>Cyperus pygmaeus</i>	GL	AN	-	-	-	-	-	-	-	-	Bdv
* <i>Cyperus rotundus</i>	GL	PE	-	-	3	-	5	6v	7	8v	
<i>Cyperus sanguinolentus</i>	GL	SP	1v	2v	-	-	-	-	-	8	
<i>Cyperus sphaeroideus</i>	GL	PE	1	2v	-	-	-	-	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Cyperus trinervis</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Cyperus vaginatus</i>	GL	PE	1	2	-	4	-	6v	-	8	
<i>Eleocharis acuta</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Eleocharis cylindrostachys</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Eleocharis plana</i>	GL	PE	-	-	-	-	-	-	-	-	Dfv
<i>Eleocharis pusilla</i>	GL	PE	-	2v	-	-	-	-	-	8v	
<i>Fimbristylis dichotoma</i> s. lat.	GL	PE	-	2v	-	4v	5	-	-	-	
‡ <i>Fimbristylis velata</i>	GL	AN	-	-	-	-	-	-	-	-	Bdv
‡ <i>Isolepis cernua</i>	GL	PE	-	-	-	-	-	-	-	-	Ehv
<i>Isolepis hookeriana</i>	GL	AN	-	2v	-	4v	-	-	-	8	
<i>Lepidosperma laterale</i>	GL	PE	1	2v	-	4v	-	-	-	8	
<i>Lipocarpa microcephala</i>	GL	AN	-	2v	-	-	-	-	-	-	
‡* <i>Schoenoplectus lineolatus</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Schoenoplectus mucronatus</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Schoenoplectus validus</i>	GL	PE	1	2	-	4v	-	-	-	8	
<i>Schoenus apogon</i>	GL	AN	1v	2v	-	4v	-	6v	-	8	
<i>Schoenus centralis</i>	GL	AN	1v	-	-	-	-	-	-	-	
<i>Scleria mackaviensis</i>	GL	PE	1v	2	-	4	-	6v	-	8	
GEITONOPLESACEAE											
<i>Eustrephus latifolius</i>	C	PE	1	2	3	4	-	6v	-	8	
‡ <i>Geitonoplesium cymosum</i>	C	PE	-	-	-	-	-	-	-	-	Egv
HYDROCHARITACEAE											
<i>Ottelia ovalifolia</i>	F	PE	-	-	-	-	-	-	-	-	Eg
‡ <i>Vallisneria gigantea</i>	F	PE	-	2v	-	-	-	-	-	-	
HYPOXIDACEAE											
<i>Hypoxis hygrometrica</i>	GL	PA	-	2v	-	4v	-	-	-	-	
IRIDACEAE											
‡* <i>Freesia hybrid</i>	GL	PA	-	-	-	-	-	6v	-	-	
‡* <i>Gladiolus carneus</i>	GL	PA	-	-	-	-	-	-	-	-	Cfv
* <i>Iris germanica</i>	GL	PE	-	-	-	-	-	6	-	-	
<i>Patersonia sericea</i> var. <i>sericea</i>	GL	PE	-	2v	-	-	-	-	-	-	
* <i>Romulea minutiflora</i>	GL	PA	-	-	-	-	-	-	-	-	Egv
‡* <i>Romulea rosea</i> var. <i>australis</i>	GL	PA	-	-	-	-	-	-	-	-	Dfv
‡* <i>Sisyrinchium iridifolium</i>	GL	SP	-	-	-	-	-	-	-	-	Ehv
* <i>Sisyrinchium</i> sp. A	GL	AN	-	2v	-	4v	-	-	-	-	
JUNCACEAE											
* <i>Juncus articulatus</i>	GL	PE	1v	-	-	4	-	6v	-	8	
* <i>Juncus bufonius</i>	GL	AN	1v	-	-	4	-	-	-	8v	
* <i>Juncus capitatus</i>	GL	AN	-	2v	-	-	-	-	-	-	
<i>Juncus filicaulis</i>	GL	PE	-	-	-	-	-	-	-	8v	
<i>Juncus filicaulis</i> × <i>J. subglaucus</i> (probably, according to NSW)	GL	PE	-	-	-	-	-	-	-	-	Cgv
<i>Juncus firmus</i>	GL	PE	1v	-	-	4v	-	-	-	8v	
<i>Juncus homalocaulis</i>	GL	PE	-	2v	-	4v	-	-	-	8v	
<i>Juncus ochrocoleus</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Juncus prismatocarpus</i>	GL	PE	-	2v	-	-	-	-	-	-	
<i>Juncus subglaucus</i>	GL	PE	-	-	-	-	-	-	7v	-	
<i>Juncus subsecundus</i>	GL	PE	-	2v	-	4v	-	-	-	-	
<i>Juncus subsecundus</i> × <i>J. aridicola</i>	GL	PE	1v	-	-	-	-	-	-	-	
<i>Juncus usitatus</i>	GL	PE	-	2v	-	-	-	6v	-	-	
<i>Juncus usitatus</i> × <i>J. subglaucus</i> (probably, according to NSW)	GL	PE	-	-	-	-	-	6v	-	-	
<i>Juncus vaginatus</i>	GL	PE	-	2v	-	4v	-	-	-	-	
<i>Luzula densiflora</i>	GL	PE	-	-	-	-	5v	-	-	-	
<i>Luzula flaccida</i>	GL	PE	-	2	-	4v	-	-	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Agrostis aemula</i>	G	PE	-	-	-	-	-	-	-	-	Eiv
<i>Agrostis avenacea</i> var. <i>avenacea</i>	G	SP	1	2	-	4	-	6v	7	8	
* <i>Aira cupaniana</i>	G	AN	1	2v	-	4v	5v	6	-	8	
<i>Amphibromus nervosus</i>	G	PE	-	-	-	-	-	-	7v	-	
* <i>Anthoxanthum odoratum</i>	G	PE	-	-	-	-	-	-	-	-	Ehv
<i>Aristida leptopoda</i>	G	PE	-	-	-	-	-	6v	7v	-	
<i>Aristida ramosa</i> var. <i>ramosa</i>	G	PE	1v	2v	3	4	5	6v	7	8	
<i>Aristida ramosa</i> var. <i>speciosa</i>	G	PE	1	2v	-	-	-	-	-	8	
<i>Arundinella nepalensis</i>	G	PE	1	2v	-	-	-	-	-	-	
* <i>Arundo donax</i>	G	PE	-	-	3v	-	-	-	-	-	
<i>Austrostipa aristiglumis</i> (= <i>Stipa aristiglumis</i>)	G	PE	-	-	-	-	-	6v	7	8	
<i>Austrostipa ramosissima</i> (= <i>Stipa ramosissima</i>)	G	PE	-	2v	-	-	-	-	-	-	
<i>Austrostipa scabra</i> subsp. <i>scabra</i> (= <i>Stipa scabra</i> subsp. <i>scabra</i>)	G	PE	1v	2	3	4	5v	6v	-	8	
<i>Austrostipa setacea</i> (= <i>Stipa setacea</i>)	G	PE	-	2v	-	4	-	6v	-	-	
<i>Austrostipa verticillata</i> (= <i>Stipa verticillata</i>)	G	PE	1	2	3	4	5	6v	-	8	
‡* <i>Avena barbata</i>	G	AN	-	2	3v	4	5	6	-	8	
* <i>Avena fatua</i>	G	AN	-	-	3	-	-	6v	7	-	
* <i>Avena ludoviciana</i>	G	AN	-	-	3	-	-	6v	7	-	
‡* <i>Avena sativa</i>	G	AN	-	-	3	-	-	-	-	-	
<i>Bothriochloa biloba</i>	G	PE	-	-	-	-	-	-	7v	-	
<i>Bothriochloa decipiens</i>	G	PE	-	-	-	-	-	-	-	-	Df
<i>Bothriochloa macra</i>	G	PE	1	2	3	4	5	6v	7v	8	
* <i>Briza maxima</i>	G	AN	-	2	-	-	-	6v	-	-	
* <i>Briza minor</i>	G	AN	1	2	-	4v	5	6v	-	8	
* <i>Bromus alopecuroides</i>	G	AN	-	-	3	-	5	-	7v	-	
<i>Bromus arenarius</i>	G	AN	1	-	-	-	5	-	7v	-	
* <i>Bromus catharticus</i>	G	SP	1	2	3	4	5	6v	7	8	
* <i>Bromus diandrus</i>	G	AN	-	2	3	-	5	-	7	8	Ehv
* <i>Bromus molliformis</i>	G	AN	1	2v	3	4	5	6v	7	8	
* <i>Bromus rubens</i>	G	AN	-	-	-	-	-	6v	-	-	
<i>Capillipedium parviflorum</i>	G	PE	-	-	-	-	-	-	-	-	Cdv-
<i>Capillipedium spicigerum</i>	G	PE	-	-	-	-	-	-	-	-	Cgv
* <i>Catapodium rigidum</i>	G	AN	1	-	3	4	-	6v	-	8	
<i>Cenchrus caliculatus</i>	G	PE	-	-	-	-	-	-	-	-	Ehv
* <i>Cenchrus ciliaris</i>	G	PE	-	2v	-	-	-	-	-	-	
* <i>Cenchrus incertus</i>	G	SP	-	2	-	4v	5v	-	-	-	
* <i>Chloris gayana</i>	G	PE	1	-	3	-	-	-	7v	8	
<i>Chloris truncata</i>	G	PE	1	2	3	4	5	6v	7	8	
<i>Chloris ventricosa</i>	G	PE	1	2	3	4	5	6v	7	8	
* <i>Chloris virgata</i>	G	SP	1	-	-	-	5	6v	-	8	
<i>Cymbopogon obtectus</i>	G	PE	1v	-	-	-	-	-	-	-	
<i>Cymbopogon refractus</i>	G	PE	1	2	3	4	5	6v	-	8	
<i>Cynodon dactylon</i>	G	PE	1	2	3	4	5	6v	7	8	
* <i>Dactylis glomerata</i>	G	PE	-	-	-	-	-	-	-	8v	
† <i>Dactyloctenium radulans</i>	G	PE	-	-	3	-	5	-	-	-	Dfv
<i>Danthonia caespitosa</i>	G	PE	-	2	-	4	5	6v	-	-	
<i>Danthonia linkii</i> var. <i>linkii</i>	G	PE	-	2	3	4	-	6v	7	8	
<i>Danthonia racemosa</i> var. <i>obtusata</i>	G	PE	-	-	-	4v	-	-	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>*Lolium rigidum</i>	G	AN	1	2	3	4	5	6v	7	8	
<i>*Melinis repens</i>	G	SP	1	-	-	-	-	-	-	-	Bbv
<i>Microlaena stipoides</i> var. <i>stipoides</i>	G	PE	1	2	3	4	5	6v	-	8	
‡ <i>*Nassella neesiana</i>	G	PE	-	-	-	-	-	-	-	-	Efv
<i>Oplismenus aemulus</i>	G	PE	-	2v	-	4	-	-	-	-	
<i>Panicum buncei</i>	G	PE	-	-	-	-	-	-	7v	-	
<i>Panicum decompositum</i>	G	PE	-	-	3	-	-	6v	-	8	
<i>Panicum effusum</i>	G	PE	1	2v	-	4	5	6v	-	8	
<i>Panicum laevinode</i>	G	PE	-	-	-	-	-	7v	-	-	
<i>*Panicum miliaceum</i>	G	AN	-	-	-	-	-	-	-	-	Cev
<i>Panicum queenslandicum</i> var. <i>queenslandicum</i>	G	PE	1v	-	-	-	-	-	-	-	
<i>*Parapholis incurva</i>	G	AN	-	-	-	-	-	-	-	-	Cfv
<i>Paspalidium aversum</i>	G	PE	-	2v	-	-	5	6v	7	8	
<i>Paspalidium gracile</i>	G	PE	1	2	3	4	-	6v	-	8	
<i>Paspalidium</i> sp. aff. <i>constrictum</i>	G	PE	-	2	-	-	-	-	-	-	
<i>*Paspalum dilatatum</i>	G	PE	1	2	3	4	5	6v	7	8	
<i>Paspalum distichum</i>	G	PE	1	2v	-	4	-	-	-	8	
<i>Pennisetum alopecuroides</i>	G	PE	1	-	4	-	-	-	-	8	Efv
<i>*Pennisetum clandestinum</i>	G	PE	1	-	3	4	-	6v	-	8	
‡ <i>*Pennisetum setaceum</i>	G	PE	1	-	-	-	-	-	-	-	Ccv
<i>*Pennisetum villosum</i>	G	PE	-	-	-	-	-	6v	7	-	
<i>Perotis rara</i>	G	AN	-	2v	-	-	-	-	-	-	
<i>*Phalaris aquatica</i>	G	PE	1	-	3	4	-	-	-	8	
<i>*Phalaris paradoxa</i>	G	AN	-	-	-	-	-	7v	-	-	
<i>Phragmites australis</i>	G	PE	-	2v	-	-	-	-	-	-	
<i>*Poa annua</i>	G	AN	1	2v	3	4	5	6v	7	8	
‡ <i>*Poa bulbosa</i>	G	AN	-	-	-	-	-	-	-	-	Ehv
<i>Poa labillardieri</i>	G	PE	-	2v	3	4	5v	6v	-	8	
<i>Poa sieberiana</i> var. <i>hirtella</i>	G	PE	-	2v	-	-	-	7v	-	-	
‡ <i>Poa sieberiana</i> var. <i>sieberiana</i>	G	PE	1v	-	-	-	-	-	-	-	
<i>*Polypogon monspeliensis</i>	G	AN	1	-	-	4	-	-	7	8	Ehv
<i>*Rostraria cristata</i>	G	AN	1	2	3	4	5	6v	7	8	
‡ <i>*Schismus barbatus</i>	G	AN	-	2v	-	-	-	-	-	-	
<i>*Setaria gracilis</i>	G	PE	1v	2v	3	4	5	-	-	8	
<i>*Setaria pumila</i>	G	AN	1	-	-	-	-	-	-	8v	
‡ <i>*Setaria verticillata</i>	G	AN	-	-	-	-	-	-	-	-	Egv
<i>*Sorghum bicolor</i> subsp. <i>bicolor</i>	G	SP	-	-	-	-	-	-	7	-	
<i>*Sorghum halepense</i>	G	PE	-	-	3	4	5	6v	7	8	
<i>Sorghum leiocladum</i>	G	PE	1	2	3	4	5	6v	-	8	
<i>Sporobolus caroli</i>	G	SP	-	-	-	-	-	6	-	-	
<i>Sporobolus creber</i>	G	PE	1	2	3	4	5	6v	-	8	
‡ <i>*Sporobolus indicus</i> var. <i>capensis</i>	G	PE	-	2v	-	-	-	-	-	-	
<i>Themeda australis</i>	G	PE	1	2v	3	4	5	6v	7	8	
<i>Themeda avenacea</i>	G	PE	-	-	-	-	-	-	7v	-	
<i>Tragus australianus</i>	G	AN	1	2	3	4	5	6v	-	-	
<i>Triodia scariosa</i>	G	PE	1v	2v	-	-	-	-	-	-	
<i>Tripogon loliiformis</i>	G	SP	-	2v	3	4v	5	-	-	-	
<i>*Triticum aestivum</i>	G	AN	-	-	3	-	-	6v	7	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>*Urochloa fasciculata</i> var. <i>reticulata</i>	G	AN	-	-	-	-	-	-	-	-	Cev
<i>Urochloa foliosa</i>	G	PE	1v	2v	-	-	-	-	-	-	
<i>*Urochloa panicoides</i>	G	AN	-	-	3	-	-	6v	7	8	
<i>Urochloa piligera</i>	G	AN	-	-	-	-	5v	-	-	-	
‡ <i>Vetiveria filipes</i>	G	PE	-	2v	-	-	-	-	-	-	
<i>*Vulpia bromoides</i>	G	AN	-	2	-	-	5v	6	-	-	
<i>*Vulpia muralis</i>	G	AN	-	2	3	4	5v	6	-	8	
<i>*Vulpia myuros</i>	G	AN	1	2	3	4	5v	6v	7	8	
POTAMOGETONACEAE											
<i>Potamogeton perfoliatus</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Potamogeton tricarlinatus</i>	F	PE	-	2v	-	-	-	-	-	-	
TYPHACEAE											
<i>Typha domingensis</i>	GL	PE	-	-	-	4	-	6v	-	-	
<i>Typha orientalis</i>	GL	PE	-	2v	-	4	-	-	-	8	
XANTHORRHOEACEAE											
<i>Xanthorrhoea glauca</i> subsp. <i>angustifolia</i>	TS	PE	1	2	3	4	-	6v	-	-	
DICOTYLEDONS											
ACANTHACEAE											
<i>Brunoniella australis</i>	F	PE	1	-	3	4	-	6v	7	-	
<i>Rostellularia adscendens</i> subsp. <i>adscendens</i>	F	PE	1	2	3	4	-	6v	7	8	
AIZOACEAE											
‡ <i>*Galenia pubescens</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
<i>Glinus lotoides</i>	F	AN	-	-	-	-	-	-	-	8v	
‡ <i>Glinus oppositifolius</i>	F	AN	-	-	-	-	-	-	-	8v	
<i>Tetragonia tetragonoides</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
<i>Zaleya galericulata</i> subsp. <i>australis</i>	F	SP	-	-	-	-	-	-	-	-	Ccv
AMARANTHACEAE											
<i>Alternanthera denticulata</i>	F	AN	1	2v	3	4v	-	-	-	8v	
<i>Alternanthera nana</i>	F	AN	-	-	-	-	5v	6	-	8v	
<i>*Alternanthera pungens</i>	F	SP	1	2	3	4	5	6v	7	8	
<i>Alternanthera</i> sp. A	F	PE	-	-	-	-	-	-	-	-	Efv
<i>Amaranthus macrocarpus</i> var. <i>macrocarpus</i>	F	AN	-	2	-	-	-	6	7	-	Dfv
<i>*Amaranthus retroflexus</i>	F	AN	1	-	3	4	5	6v	7	8	
<i>*Amaranthus viridis</i>	F	AN	-	-	-	-	-	6v	-	-	
<i>*Gomphrena celosioides</i>	F	AN	1	-	3	4	5	6v	-	8	
<i>*Guilleminea densa</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
<i>Nyssanthus diffusa</i>	F	SP	-	2v	-	-	-	-	-	8	
AMYGDALACEAE											
‡ <i>*Prunus armeniaca</i>	T	PE	-	-	-	-	-	6	-	-	
<i>*Prunus cerasifera</i>	T	PE	-	-	-	-	-	6v	-	8	
<i>*Prunus persica</i> var. <i>persica</i>	T	PE	1v	2	-	4	-	6v	-	-	
ANACARDIACEAE											
<i>*Pistacia chinensis</i>	T	PE	-	-	-	-	-	6v	-	-	
<i>*Schinus areira</i>	T	PE	1	2	3	4	5	6v	7	8	
APIACEAE											
<i>*Ammi majus</i>	F	SP	1	2	3	-	-	6v	7	8	
<i>*Berula erecta</i>	F	PE	-	-	-	-	-	-	-	-	Efv
<i>*Ciclospermum leptophyllum</i>	F	AN	1	2	3	4	5	6	7v	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
* <i>Conium maculatum</i>	F	SP	-	2v	-	-	-	-	-	8	
<i>Daucus glochidiatus</i> form C	F	AN	-	-	-	-	-	-	-	7v	
<i>Daucus glochidiatus</i> form F	F	AN	1	2v	3	4	5	6v	-	8	
* <i>Foeniculum vulgare</i>	F	SP	-	2	3	-	5	6v	-	8	
<i>Hydrocotyle laxiflora</i>	F	PE	1	-	3	4	5	6v	-	8	
<i>Hydrocotyle tripartita</i>	F	PE	1v	2v	-	4v	-	-	-	-	
* <i>Torilis nodosa</i>	F	AN	-	-	3v	4	-	-	-	-	
<i>Trachymene incisa</i>	F	PE	-	2v	-	-	-	-	-	-	
APOCYNACEAE											
<i>Alstonia constricta</i> (narrow-leaved pubescent form)	TS	PE	-	-	-	-	-	-	-	-	Dcv
<i>Alstonia constricta</i> (type form)	TS	PE	-	-	-	-	-	-	-	-	Dfv
* <i>Mandevilla laxa</i>	C	PE	-	-	-	-	-	6v	-	-	
* <i>Nerium oleander</i>	TS	PE	-	-	-	-	-	6v	-	-	
<i>Parsonsia eucalyptophylla</i>	C	PE	-	-	-	-	-	6	-	-	
<i>Parsonsia lanceolata</i>	C	PE	-	2	3v	-	-	6v	-	-	
* <i>Vinca major</i>	F	PE	-	-	-	-	-	6	-	-	Egv
ARALIACEAE											
* <i>Hedera helix</i>	C	PE	-	-	-	-	-	6v	-	-	
ASCLEPIADACEAE											
* <i>Araujia sericifera</i>	C	PE	-	-	-	-	-	6v	-	-	
* <i>Gomphocarpus fruticosus</i>	F	PE	1	2	3	4	5	6v	7	8	
<i>Marsdenia pleiadenia</i> (= <i>Gymnema pleiadenium</i>)	C	PE	-	-	-	-	-	6v	-	-	
‡ <i>Marsdenia rostrata</i>	C	PE	-	-	-	-	-	-	-	-	Ehv
<i>Marsdenia viridiflora</i>	C	PE	-	-	-	4v	-	-	-	-	
<i>Sarcostemma viminale</i> subsp. <i>brunnonianum</i>	F	PE	-	2	-	4	-	-	-	-	
* <i>Tweedia coerulea</i>	F	PE	-	-	-	-	-	6v	-	8	
ASTERACEAE											
<i>Actinobole uliginosum</i>	F	AN	-	2v	-	-	-	-	-	-	
<i>Ammobium alatum</i>	F	SP	1	2v	-	-	-	-	-	-	
‡* <i>Anthemis cotula</i>	F	AN	-	-	-	-	-	-	-	-	Eiv
* <i>Arctotheca calendula</i>	F	AN	-	2	3	-	5	6v	-	8	
‡* <i>Artemisia ludoviciana</i>	F	PE	-	-	-	-	-	6v	-	-	
* <i>Aster subulatus</i>	F	SP	1	2	-	4	5	6v	7	8	
* <i>Bidens pilosa</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Bidens subalternans</i>	F	AN	1	2v	3	4v	5	6v	7	8	
<i>Brachyscome angustifolia</i> var. <i>heterophylla</i>	F	PE	1v	2v	-	4	-	-	-	8	
<i>Brachyscome ciliaris</i> var. <i>lanuginosa</i>	F	PE	-	-	-	-	-	-	-	-	Cev
<i>Brachyscome ciliaris</i> var. <i>subintegrifolia</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
<i>Brachyscome curvicarpa</i>	F	AN	-	-	-	-	-	-	-	-	Cfv
<i>Brachyscome gracilis</i>	F	AN	-	2v	-	-	-	-	-	-	
<i>Brachyscome multifida</i> var. <i>multifida</i>	F	AN	1v	2v	-	-	-	-	-	-	
<i>Brachyscome nova-anglica</i>	F	AN	1v	-	-	4v	-	-	-	-	
<i>Brachyscome procumbens</i>	F	PE	-	-	-	-	-	-	-	-	Dev
‡ <i>Brachyscome rigidula</i> s. lat.	F	PE	-	-	-	-	-	-	-	-	Ehv
‡ <i>Brachyscome</i> sp. A	F	AN	-	-	-	-	-	-	-	-	Eev
<i>Bracteantha bracteata</i>	F	AN	-	2v	-	4	-	6	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
* <i>Calendula officinalis</i>	F	AN	-	-	-	-	-	6v	-	-	
<i>Calotis cuneifolia</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Calotis hispidula</i>	F	AN	-	-	-	-	-	-	-	-	Bdv
<i>Calotis lappulacea</i>	F	PE	1	2	3	4	5	6v	-	8	
<i>Calotis scabiosifolia</i> var. <i>scabiosifolia</i>	F	PE	-	-	-	-	-	-	7v	-	
* <i>Carduus tenuiflorus</i>	F	AN	1	2	3	4	5	6v	-	8v	
* <i>Carthamus lanatus</i>	F	AN	1	2	3	4	5	6v	7	8	
<i>Cassinia arcuata</i>	LS	PE	-	-	-	4v	-	-	-	-	
<i>Cassinia laevis</i>	LS	PE	1	2v	3	4	-	-	-	-	
<i>Cassinia quinquefaria</i>	LS	PE	-	2	-	-	5	6v	-	8v	
<i>Cassinia uncata</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Cassinia</i> sp. B (aff. <i>leptocephala</i>)	LS	PE	-	-	-	4v	-	-	-	-	
* <i>Centaurea calcitrapa</i>	F	SP	1	-	-	4	-	6	-	8v	
* <i>Centaurea melitensis</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Centaurea solstitialis</i>	F	SP	1	-	3	4	5	6v	7	8	
<i>Centipeda minima</i>	F	AN	1	2v	-	-	-	-	-	8	
* <i>Chondrilla juncea</i>	F	PE	1	2	3	4	5	6	7	8	
<i>Chrysocephalum</i> <i>apiculatum</i> s. lat.	F	PE	1	2v	3	4	5	6v	7	8	
<i>Chrysocephalum</i> <i>semipapposum</i> s. lat.	F	PE	-	-	-	-	-	-	-	-	Cev
* <i>Cichorium intybus</i>	F	PE	-	-	3	-	-	-	7	-	Dfv
* <i>Cirsium vulgare</i>	F	SP	1	2	3	4	5	6v	7	8	
* <i>Conyza albida</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Conyza bonariensis</i>	F	AN	1	2v	3	4	5	6v	7	8	
‡* <i>Conyza parva</i>	F	AN	-	2v	3v	4v	5v	-	-	-	
* <i>Coreopsis lanceolata</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
* <i>Cosmos bipinnatus</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
<i>Cotula australis</i>	F	SP	1	2	-	4	5v	6v	-	8	
* <i>Crepis capillaris</i>	F	SP	-	2v	-	-	-	6	-	8v	
<i>Cymbonotus lawsonianus</i>	F	PE	1	2	3	4v	5	6v	7	8	
* <i>Dimorphotheca pluvialis</i>	F	AN	-	-	-	-	-	6v	-	-	
* <i>Dittrichia graveolens</i>	F	AN	1v	2	-	4	-	-	-	8	
<i>Eclipta platyglossa</i>	F	AN	1v	-	-	-	-	-	-	-	
<i>Euchiton gymnocephalus</i> (= <i>Gnaphalium gymnocephalum</i>)	F	PE	1	2v	-	4v	-	6v	-	8	
<i>Euchiton involucratus</i> (= <i>Gnaphalium involucratum</i>)	F	PE	1	2	-	4v	5	6v	7	8	
<i>Euchiton sphaericus</i> (= <i>Gnaphalium sphaericum</i>)	F	SP	1	2v	3	4v	5	6v	-	-	
* <i>Gamochaeta calviceps</i> (= <i>Gnaphalium calviceps</i>)	F	AN	1	2v	-	-	-	-	-	-	
* <i>Gamochaeta purpurea</i> (= <i>Gnaphalium coarctatum</i>)	F	SP	1v	2v	-	4	5	6	-	-	
<i>Glossogyne tannensis</i>	F	PE	1	2	3	4	5	6v	-	8	
‡* <i>Gnaphalium polycaulon</i>	F	AN	-	2v	-	-	-	-	-	-	
* <i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	F	AN	-	-	3	-	5	6v	7	8	
* <i>Helianthus annuus</i>	F	SP	-	-	3v	-	-	6v	-	-	
* <i>Hypochaeris glabra</i>	F	AN	1	2	3	4v	5	6v	7	8	
* <i>Hypochaeris microcephala</i> var. <i>albiflora</i>	F	PE	1v	2v	-	-	-	-	-	-	
* <i>Hypochaeris radicata</i>	F	PE	1	2	3	4v	5	6	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Isoetopsis graminifolia</i>	GL	AN	-	-	-	4v	-	6v	-	-	
<i>Ixiolaena tomentosa</i>	F	PE	-	-	-	-	-	-	7v	-	
* <i>Lactuca saligna</i>	F	SP	1	2	3	4	-	6v	7	8	
* <i>Lactuca serriola</i>	F	SP	1	2	3	4	5	6v	7	8	
<i>Lagenifera stipitata</i>	F	PE	-	2	-	4v	5	6v	-	8	
‡* <i>Lapsana communis</i> subsp. <i>communis</i>	F	AN	-	2v	-	-	-	-	-	-	
<i>Leptorhynchos panaetioides</i>	F	PE	-	-	-	-	-	6v	7v	-	
<i>Leptorhynchos squamatus</i> subsp. A	F	PE	-	-	-	-	-	6v	-	-	
<i>Leucochrysum albicans</i> subsp. <i>albicans</i> var. <i>albicans</i>	F	PE	1v	-	-	-	-	-	-	-	
<i>Microseris lanceolata</i> (rhizomatous form)	F	PA	-	-	-	-	-	-	7v	-	
<i>Microseris lanceolata</i> (tuberous form)	F	PA	1v	-	-	-	-	-	-	8	
<i>Minuria cunninghamii</i> s. lat.	F	PE	1v	-	-	-	-	-	-	-	Ehv
<i>Minuria leptophylla</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
<i>Olearia elliptica</i>	LS	PE	1	2	3	4	-	6v	7	8	
<i>Olearia ramosissima</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Olearia viscidula</i>	LS	PE	1v	2	-	4	-	6v	-	8	
* <i>Onopordum illyricum</i> subsp. <i>illyricum</i>	F	PE	-	-	-	-	-	-	-	-	Eiv
‡ <i>Ozothamnus ferrugineus</i> s. lat.	TS	PE	-	-	-	-	-	-	-	-	Eiv
<i>Ozothamnus obcordatus</i> subsp. <i>major</i>	LS	PE	-	2v	-	-	-	-	-	-	
‡ <i>Picris angustifolia</i> subsp. <i>carolorum-henricorum</i>	F	AN	-	-	-	4v	-	6v	-	-	
‡ <i>Picris eichleri</i>	F	AN	1v	-	-	-	-	-	-	-	
<i>Podolepis jaceoides</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Podolepis neglecta</i>	F	PE	-	-	-	4v	-	-	-	-	
<i>Pseudognaphalium luteoalbum</i>	F	AN	1	2v	-	4	-	-	-	8v	
<i>Pycnosorus globosus</i>	F	PE	-	-	-	-	-	-	7v	-	
<i>Rhodanthe anthemoides</i>	F	PE	-	-	-	4v	-	-	-	-	
* <i>Schkuhria pinnata</i> var. <i>abrotanoides</i>	F	AN	-	-	3	4	5	6v	7	8	
<i>Senecio diaschides</i>	F	PE	1v	2v	-	-	-	-	-	-	
<i>Senecio hispidulus</i> var. <i>dissectus</i>	F	PE	1	2v	-	4	5	6v	-	8	
<i>Senecio hispidulus</i> var. <i>hispidulus</i>	F	PE	1	2v	-	4v	5	-	-	-	
<i>Senecio lautus</i> subsp. <i>dissectifolius</i>	F	PE	1v	2	-	4v	-	6v	-	-	
‡* <i>Senecio madagascariensis</i>	F	SP	-	-	-	-	-	-	-	-	Dfv
<i>Senecio quadridentatus</i>	F	PE	1	2	3	4	-	6v	7	8	
‡ <i>Senecio</i> sp. E	F	PE	1v	-	-	-	-	-	-	-	
<i>Sigesbeckia australiensis</i>	F	AN	1	2	3	4	5	6v	-	8	
* <i>Silybum marianum</i>	F	SP	1	2	3	4	5	6v	7v	8	
<i>Solenogyne bellioides</i>	F	PE	-	2v	-	4	-	-	-	-	
* <i>Soliva anthemifolia</i>	F	AN	-	2v	-	-	-	-	-	-	
* <i>Soliva sessilis</i>	F	AN	1	2	-	4v	-	6v	-	8	
* <i>Soliva stolonifera</i>	F	AN	-	-	-	4v	-	6	-	-	
‡* <i>Sonchus asper</i>	F	AN	-	-	-	-	-	-	-	-	Efv
* <i>Sonchus oleraceus</i>	F	AN	1	2	3	4	5	6v	7	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
subsp. <i>glaucescens</i>											
<i>Stuartina hamata</i>	F	AN	-	2v	-	4v	5	6v	-	8v	
<i>Stuartina muelleri</i>	F	AN	-	-	-	4v	-	-	-	-	
* <i>Tagetes minuta</i>	F	AN	1	2	-	4	-	6v	-	8	
* <i>Taraxacum officinale</i>	F	PE	1	-	-	4	-	6v	-	8	
* <i>Tolpis umbellata</i>	F	AN	-	2v	-	4v	5	-	-	8	
* <i>Tragopogon porrifolius</i>	F	SP	-	-	3	-	-	6v	7	8	
<i>Triptilodiscus pygmaeus</i>	F	AN	-	2	-	4v	5	6v	-	-	
* <i>Verbesina encelioides</i> subsp. <i>encelioides</i>	F	AN	-	2	-	-	-	-	-	-	Ccv
<i>Vittadinia muelleri</i>	F	PE	1	2v	3	4	5	6v	-	8	
<i>Vittadinia sulcata</i>	F	AN	1	2	3	4	-	6v	7	8	
* <i>Xanthium occidentale</i>	F	AN	1	2	-	4	-	6v	-	8	
* <i>Xanthium spinosum</i>	F	AN	1	2	3	-	5	6	7	8	
* <i>Zinnia peruviana</i>	F	AN	1	2v	-	-	-	-	-	-	
BASELLACEAE											
* <i>Anredera cordifolia</i>	C	PA	-	-	3	-	-	-	-	-	Dfv
BERBERIDACEAE											
* <i>Nandina domestica</i>	LS	PE	-	-	-	-	-	6v	-	8	
BIGNONIACEAE											
* <i>Jacaranda mimosifolia</i>	T	PE	-	-	-	-	-	6v	-	-	
* <i>Macfadyena unguis-cati</i>	C	PE	-	-	-	-	-	6v	-	-	
<i>Pandorea pandorana</i>	C	PE	-	2	3	4	-	6v	-	8	
BORAGINACEAE											
* <i>Amsinckia calycina</i>	F	AN	-	-	-	4v	-	6v	-	-	
‡ <i>Austrocynoglossum latifolium</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
* <i>Buglossoides arvensis</i>	F	AN	-	-	3	4	-	6v	7v	-	
<i>Cynoglossum australe</i>	F	PE	1v	2	-	4	5	6	-	8v	
<i>Cynoglossum suaveolens</i>	F	PE	-	-	-	-	-	6v	-	-	
* <i>Echium plantagineum</i>	F	AN	1	2	3	4	5	6v	-	8	
* <i>Heliotropium amplexicaule</i>	F	PE	-	2	-	-	5	6v	-	8	
<i>Myosotis australis</i>	F	SP	-	2v	-	-	-	-	-	-	
* <i>Myosotis discolor</i>	F	AN	-	2v	-	-	5v	-	-	-	
<i>Plagiobothrys plurisepaleus</i>	F	AN	-	-	-	-	-	-	-	-	Efv
BRASSICACEAE											
* <i>Capsella bursa-pastoris</i>	F	AN	1	2	3	4	5	6v	7	8	
<i>Cardamine papillata</i> (previously part of <i>C. paucijuga</i>)	F	AN	1v	2v	-	4v	-	-	-	-	
* <i>Coronopus didymus</i>	F	SP	-	-	-	-	-	6v	-	-	
* <i>Hirschfeldia incana</i>	F	SP	1	2	3	4	5	6v	-	8	
* <i>Lepidium africanum</i>	F	SP	1	2	3	4	5	6v	7v	8	
* <i>Lepidium bonariense</i>	F	SP	1	2v	-	4	-	6v	-	8	
<i>Lepidium fasciculatum</i>	F	AN	-	-	-	-	-	-	-	-	Cev
‡ <i>Lepidium pseudohyssopifolium</i>	F	SP	1v	-	-	-	-	-	-	-	
* <i>Raphanus raphanistrum</i>	F	SP	-	-	-	4	-	-	-	-	Dfv
* <i>Rapistrum rugosum</i>	F	SP	-	-	3	4	-	6v	7	-	
<i>Rorippa eustylis</i>	F	AN	-	2v	-	-	-	-	-	-	
<i>Rorippa laciniata</i>	F	PE	-	2v	-	-	-	-	-	-	8v
* <i>Rorippa nasturtium-aquaticum</i>	F	PE	-	-	-	4	-	-	-	8	Ehv
* <i>Rorippa palustris</i>	F	SP	-	2v	-	-	-	-	-	-	
* <i>Sisymbrium irio</i>	F	SP	-	-	3	-	-	6	7v	-	
* <i>Sisymbrium officinale</i>	F	SP	1	2	3	4	5	6v	-	8	
* <i>Sisymbrium orientale</i>	F	SP	-	-	3v	4	-	6v	7	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
CACTACEAE											
* <i>Opuntia aurantiaca</i>	F	PE	-	-	3	4	5	6	-	-	
* <i>Opuntia imbricata</i>	LS	PE	-	-	-	-	-	-	-	-	Df
* <i>Opuntia stricta</i> var. <i>stricta</i>	LS	PE	1	2	3	4	5	6	7	8	
‡* <i>Opuntia vulgaris</i>	TS	PE	-	-	-	-	-	6	-	-	
CALLITRICHACEAE											
‡* <i>Callitriche stagnalis</i>	F	AN	-	2v	-	-	-	-	-	-	
CAMPANULACEAE											
<i>Wahlenbergia communis</i>	F	PE	1v	2v	3	-	5v	-	7v	-	
<i>Wahlenbergia gracilis</i>	F	PE	-	2v	-	4v	-	6v	-	8	
<i>Wahlenbergia luteola</i>	F	PE	-	-	-	-	-	-	7v	-	
<i>Wahlenbergia planiflora</i>	F	PE	-	2v	3	4v	5v	6v	-	8	
subsp. <i>longipila</i>											
<i>Wahlenbergia stricta</i>	F	PE	1v	2	-	-	-	6v	-	8	
subsp. <i>stricta</i>											
CAPPARIDACEAE											
<i>Capparis mitchellii</i>	T	PE	-	-	-	-	-	6	-	-	Dfv
CAPRIFOLIACEAE											
‡* <i>Lonicera fragrantissima</i>	LS	PE	-	-	-	-	-	-	-	-	Bev
* <i>Lonicera japonica</i>	C	PE	-	-	-	-	-	-	-	-	Dfv
CARYOPHYLLACEAE											
* <i>Arenaria leptoclados</i>	F	AN	1	2	3v	4	5v	6	-	8	
* <i>Cerastium fontanum</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
subsp. <i>vulgare</i>											
* <i>Cerastium glomeratum</i>	F	AN	1	2	-	4	5	6v	-	8	
* <i>Gypsophila tubulosa</i>	F	AN	1v	2	-	4v	-	-	-	-	
* <i>Moenchia erecta</i>	F	AN	-	2v	-	-	-	-	-	-	
* <i>Paronychia brasiliiana</i>	F	PE	1	2	-	4	5	6v	-	8	
* <i>Petrorhagia nanteuilii</i>	F	AN	1	2	3	4v	5	6v	-	8	
* <i>Polycarpon tetraphyllum</i>	F	AN	1v	2v	-	4	5	6v	-	8	
‡* <i>Sagina apetala</i>	F	AN	1	2	-	4v	-	6	-	8v	
<i>Scleranthus biflorus</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
<i>Scleranthus diander</i>	F	PE	1v	-	-	-	-	-	-	-	
* <i>Silene gallica</i> var. <i>gallica</i>	F	AN	-	2v	-	-	-	-	-	-	
‡* <i>Silene gallica</i>	F	AN	-	-	-	4v	-	-	-	-	
var. <i>quinquevulnera</i>											
‡* <i>Silene nocturna</i>	F	AN	1v	-	-	-	-	-	-	-	
* <i>Spergularia rubra</i>	F	SP	1v	-	-	-	5	-	-	8	
<i>Stellaria angustifolia</i>	F	PE	1v	2v	-	4v	5	6	-	-	
* <i>Stellaria media</i>	F	SP	1	2	3	4	5	6v	-	8	
‡* <i>Stellaria pallida</i>	F	AN	1	2	-	-	5v	-	-	-	
<i>Stellaria pungens</i>	F	PE	-	2v	-	-	-	-	-	8	
CASUARINACEAE											
<i>Casuarina cunninghamiana</i>	T	PE	1	2v	-	4	-	-	-	8	
subsp. <i>cunninghamia</i>											
CELASTRACEAE											
‡ <i>Celastrus australis</i>	C	PE	-	-	-	-	-	-	-	-	Dev
<i>Maytenus cunninghamii</i>	TS	PE	-	-	-	4	-	6v	-	-	
CHENOPODIACEAE											
<i>Atriplex semibaccata</i>	F	PE	1v	-	3	4v	-	6v	-	8	
* <i>Chenopodium album</i>	F	AN	-	-	3	-	5	6v	-	8	
* <i>Chenopodium ambrosioides</i>	F	PE	1	2v	-	-	5	6v	-	8	
<i>Chenopodium pumilio</i>	F	AN	1	2	3	4	5	6v	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
(to 2 m high)											
<i>Daviesia latifolia</i>	LS	PE	-	-	-	-	-	-	-	-	Eiv
‡ <i>Daviesia leptophylla</i>	LS	PE	-	-	-	-	-	-	-	-	Ehv
<i>Daviesia pubigera</i>	LS	PE	1v	-	-	-	-	-	-	-	
<i>Desmodium brachypodum</i>	F	PE	1	2	3	4	5	6v	-	8	
<i>Desmodium varians</i>	F	PE	1	2	3	4	5	6v		8	
<i>Dillwynia sieberi</i>	LS	PE	-	2v	-	-	-	-	-	-	
* <i>Genista monspessulana</i>	LS	PE	-	-	-	-	-	-	-	-	Ehv
‡* <i>Gleditsia triacanthos</i>	T	PE	-	-	-	-	-	-	-	-	Dfv
<i>Glycine clandestina</i> var. <i>sericea</i>	C	PE	1	2	3	4v	5	6v	-	8	
‡ <i>Glycine clandestina</i> (serpentine form)	C	PE	1	-	-	-	-	-	-	-	Ehv
<i>Glycine latifolia</i>	C	PE	-	-	-	-	-	6v	7v	-	
<i>Glycine tabacina</i>	C	PE	1	2v	3v	4v	5v	6v	-	-	
<i>Glycine tomentella</i> s. <i>lat.</i>	C	PE	-	-	3	4	-	6v	-	8	
<i>Hardenbergia violacea</i>	C	PE	1	2	-	4v	5	6v	-	8	
<i>Hovea lanceolata</i>	LS	PE	-	2	-	4v	-	6v	-	-	
<i>Hovea linearis</i>	LS	PE	-	-	-	-	-	-	-	-	Ehv
‡ <i>Hovea</i> sp.	LS	PE	1v	-	-	-	-	-	-	-	
<i>Indigofera adesmifolia</i>	LS	PE	-	2	-	4	-	6v	-	-	
<i>Indigofera australis</i>	LS	PE	-	-	-	-	-	-	-	8v	
‡ <i>Indigofera linifolia</i>	F	PE	-	-	-	-	-	-	-	-	Aev
‡* <i>Lathyrus odoratus</i>	F	AN	-	-	3	-	-	6v	-	-	
<i>Lespedeza juncea</i> subsp. <i>sericea</i>	LS	PE	-	2v	-	-	-	-	-	8v	
<i>Lotus australis</i>	F	PE	1v	-	3	4	-	6v	-	-	
* <i>Macroptilium atropurpureum</i>	C	AN	-	-	-	-	-	-	-	-	Dgv
* <i>Medicago arabica</i>	F	AN	1	-	-	4	-	6	-	8v	
* <i>Medicago laciniata</i>	F	AN	-	-	-	-	-	-	-	-	Bdv
* <i>Medicago lupulina</i>	F	SP	1	-	3	4	-	6v	-	8v	
* <i>Medicago minima</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Medicago orbicularis</i>	F	AN	-	-	3	-	-	6v	7	8	
* <i>Medicago polymorpha</i> var. <i>vulgaris</i>	F	AN	1	2	3	4	-	6v	7	8	
* <i>Medicago sativa</i>	F	PE	1	-	3	-	5	6v	7	8	
‡* <i>Medicago scutellata</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
* <i>Medicago truncatula</i>	F	AN	-	2	-	-	-	-	7v	-	
* <i>Melilotus albus</i>	F	SP	-	-	-	-	-	6v	-	8	
* <i>Melilotus indicus</i>	F	AN	1	-	3	4	-	6v	7	8	
<i>Mirbelia pungens</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Neptunia gracilis</i>	F	PE	-	-	-	-	-	-	7	-	Dfv
<i>Pultenaea foliolosa</i>	LS	PE	1v	2v	-	-	-	-	-	-	
<i>Pultenaea microphylla</i>	LS	PE	-	-	-	-	-	-	-	-	Ehv
<i>Pultenaea</i> sp. G (aff. <i>microphylla</i>)	LS	PE	-	2v	-	-	-	-	-	-	
<i>Rhynchosia minima</i>	C	PE	-	-	3	4	-	6v	7	8	
* <i>Robinia pseudoacacia</i>	T	PE	-	-	-	-	-	-	-	-	Ehv
<i>Senna aciphylla</i>	LS	PE	-	-	-	4v	-	-	-	-	
<i>Senna artemisioides</i> subsp. <i>zygophylla</i>	LS	PE	-	-	-	-	-	6v	-	-	
<i>Senna barclayana</i>	F	PE	1	-	3	4	-	6v	7	-	
<i>Senna coronilloides</i>	LS	PE	-	-	-	-	-	6v	-	-	
* <i>Senna pendula</i> var. <i>glabrata</i>	T	PE	-	-	-	-	-	-	-	-	Cgv
<i>Swainsona galegifolia</i>	F	PE	1	-	3	4	-	6v	-	8	
<i>Swainsona monticola</i>	F	PE	-	-	-	-	-	6v	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Swainsona reticulata</i>	F	PE	-	-	-	4v	5	-	7v	8	
<i>Templetonia stenophylla</i>	LS	PE	1v	-	-	-	-	6v	-	-	
<i>Tephrosia brachyodon</i>	F	PE	1v	-	-	-	-	6v	-	-	
* <i>Trifolium angustifolium</i>	F	AN	-	-	-	-	-	6v	7	8	
* <i>Trifolium arvense</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Trifolium campestre</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Trifolium cernuum</i>	F	AN	-	2v	-	4v	5	-	-	8	
* <i>Trifolium dubium</i>	F	AN	1	2v	-	4	5	-	-	8	
* <i>Trifolium fragiferum</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
* <i>Trifolium glomeratum</i>	F	AN	1v	2	3	4	5	6v	7	8	
* <i>Trifolium pratense</i>	F	PE	-	-	-	-	-	-	-	8	Efv
* <i>Trifolium repens</i>	F	PE	1	2	3	4	5	6v	7	8	
‡* <i>Trifolium resupinatum</i>	F	AN	-	-	-	-	-	-	-	-	Cgv
* <i>Trifolium striatum</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
* <i>Trifolium subterraneum</i>	F	AN	-	-	-	-	5	-	-	8v	
* <i>Trifolium tomentosum</i>	F	AN	1v	-	-	-	-	-	7	8v	
* <i>Vicia hirsuta</i>	C	AN	-	-	-	-	-	-	-	8v	
‡* <i>Vicia monantha</i> subsp. <i>triflora</i>	C	AN	-	-	-	-	-	6v	-	-	
* <i>Vicia sativa</i> subsp. <i>angustifolia</i>	C	AN	1	2v	-	-	-	6	-	8	
* <i>Vicia villosa</i> subsp. <i>eriocarpa</i>	C	AN	-	-	3	-	-	-	7v	-	
<i>Zornia dyctiocarpa</i> var. <i>dyctiocarpa</i>	F	PE	-	2v	-	4	-	-	-	-	
FUMARIACEAE											
* <i>Fumaria bastardii</i>	F	AN	-	2v	-	-	-	-	-	-	
* <i>Fumaria capreolata</i> subsp. <i>capreolata</i>	F	AN	1v	2	3v	4	5	6v	7	8	
* <i>Fumaria densiflora</i>	F	AN	1	-	3v	4	-	-	-	-	
* <i>Fumaria muralis</i> subsp. <i>muralis</i>	F	AN	1v	-	4	-	6v	-	-		
GENTIANACEAE											
* <i>Centaurium erythraea</i>	F	AN	-	2	-	-	-	6v	-	8	
‡ <i>Centaurium spicatum</i>	F	AN	-	2v	-	-	-	-	-	-	
* <i>Centaurium tenuiflorum</i>	F	AN	1	2	3	4	5v	6	-	8v	
GERANIACEAE											
* <i>Erodium cicutarium</i>	F	AN	1	2	-	4	5	6v	-	8v	
<i>Erodium cicutarium</i>	F	AN	1	2	3	4	5	6v	7	8	
* <i>Geranium molle</i> subsp. <i>molle</i>	F	SP	1	2v	3	4	5	6v	-	8	
<i>Geranium solanderi</i> var. <i>solanderi</i>	F	PE	1	2	3	4v	5	6v	7	8	
<i>Pelargonium australe</i>	F	PE	-	-	-	-	-	-	-	8v	
* <i>Pelargonium</i> × <i>hortorum</i>	F	PE	-	-	-	-	-	6v	-	-	
GOODENIACEAE											
<i>Goodenia glabra</i>	F	PE	1	-	3	4	5	6v	-	-	
<i>Goodenia hederacea</i> subsp. <i>hederacea</i>	F	PE	1v	2	-	4v	-	-	-	8v	
<i>Goodenia pinnatifida</i>	F	AN	1	-	3	4	-	6v	7v	-	
<i>Velleia paradoxa</i>	F	PE	-	-	-	-	-	6v	-	-	
HALORAGACEAE											
‡ <i>Gonocarpus tetragynus</i>	F	PE	-	-	-	-	-	-	-	8v	
<i>Haloragis glauca</i> forma <i>glauca</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
<i>Haloragis heterophylla</i>	F	PE	-	2v	-	4v	5	-	-	8	
<i>Haloragis heterophylla</i> intergrade with <i>H. aspera</i>	F	PE	-	-	-	-	-	-	7v	-	
<i>Haloragis serra</i>	F	PE	-	-	3	4	-	6v	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
‡ <i>Myriophyllum pedunculatum</i> subsp. <i>longibracteolatum</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Myriophyllum verrucosum</i>	F	PE	1	2v	-	-	-	-	-	8v	
LAMIACEAE											
<i>Ajuga australis</i> s. lat.	F	PE	1v	2	-	4v	5	6v	-	8	
* <i>Lamium amplexicaule</i>	F	AN	1	2	3	4	5	6	7v	8	
* <i>Marrubium vulgare</i>	F	PE	1	2	3	4	5	6v	7	8	
<i>Mentha laxiflora</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Mentha satuireioides</i>	F	PE	1	-	-	-	-	6v	7	8	
‡* <i>Mentha</i> × <i>spicata</i>	F	PE	1v	-	-	-	-	-	-	-	
<i>Mentha</i> sp. (aff. <i>diemenica</i>)	F	PE	-	-	-	-	-	6v	-	-	
<i>Plectranthus parviflorus</i>	F	PE	-	2v	-	4v	-	6v	-	-	
<i>Prostanthera nivea</i> var. <i>nivea</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Salvia plebeia</i>	F	PE	1v	-	-	-	-	-	-	-	
* <i>Salvia reflexa</i>	F	AN	1	-	3	-	-	6v	7	-	
* <i>Salvia verbenaca</i>	F	PE	1	-	3	-	5	6v	7	8	
<i>Scutellaria humilis</i>	F	PE	1	2	-	4	-	6v	-	8	
* <i>Stachys arvensis</i>	F	AN	-	2	-	-	-	-	7	8	
<i>Teucrium argutum</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
<i>Teucrium</i> sp. A	F	PE	-	-	-	-	-	-	-	-	Cdv
<i>Teucrium</i> sp. D	F	PE	-	-	-	-	-	-	-	-	Eev
LINACEAE											
<i>Linum marginale</i>	F	PE	1v	-	3	-	-	-	-	-	
LOBELIACEAE											
<i>Isotoma axillaris</i>	F	PE	-	2	-	4	5	-	-	8v	
<i>Isotoma fluviatilis</i> subsp. <i>borealis</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Lobelia gibbosa</i>	F	AN	1v	-	-	-	-	-	-	-	
<i>Pratia concolor</i>	F	PE	-	-	-	-	-	6v	7	-	
<i>Pratia purpurascens</i>	F	PE	1v	-	-	4	-	6v	-	8	
LOGANIACEAE											
<i>Logania albiflora</i>	LS	PE	1v	-	-	-	-	-	-	8	
LORANTHACEAE											
<i>Amyema bifurcatum</i> var. <i>bifurcatum</i>	P	PE	1v	-	-	-	-	-	-	-	
<i>Amyema cambagei</i>	P	PE	1	2v	-	-	-	-	-	8	
<i>Amyema miquelii</i>	P	PE	1	2v	3	4	5	6v	-	8	
<i>Amyema miraculosum</i> subsp. <i>boormanii</i>	P	PE	1v	-	3v	-	-	-	-	8v	
<i>Amyema quandang</i> var. <i>quandang</i> intergrade with var. <i>bancroftii</i>	P	PE	-	2v	-	-	-	-	-	-	
<i>Dendrophthoe glabrescens</i>	P	PE	1v	-	-	-	-	-	-	-	
<i>Dendrophthoe vitellina</i>	P	PE	-	-	3	4	-	6v	-	8	
<i>Lysiana subfalcata</i>	P	PE	-	-	-	-	-	6v	-	-	
<i>Muellerina bidwillii</i>	P	PE	-	2v	-	4	-	6v	-	-	
<i>Muellerina eucalyptoides</i>	P	PE	-	2	-	4v	-	-	-	8	
LYTHRACEAE											
‡ <i>Lythrum hyssopifolia</i>	F	AN	-	-	-	-	-	-	-	8v	
MALACEAE											
* <i>Cotoneaster glaucophyllus</i>	TS	PE	-	-	-	-	5	6v	-	-	
‡* <i>Cotoneaster pannosus</i>	TS	PE	-	-	-	-	-	6v	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
‡* <i>Crataegus monogyna</i>	TS	PE	-	-	-	-	-	-	-	-	Egv
* <i>Malus × domestica</i>	TS	PE	-	-	-	-	-	-	6v	-	
* <i>Photinia serratifolia</i>	TS	PE	-	-	-	-	-	-	6v	-	
* <i>Pyracantha angustifolia</i>	TS	PE	-	-	-	-	-	-	6v	-	
* <i>Pyracantha crenulata</i>	TS	PE	-	-	-	-	-	-	6v	-	
‡* <i>Pyracantha fortuneana</i> TS	PE		-	-	-	-	-	-	6v	-	
‡* <i>Pyracantha rogersiana</i> TS	PE		-	-	-	-	-	-	-	8	Ehv
‡* <i>Spiraea cantoniensis</i> var. <i>lanceolata</i>	LS	PE	-	-	-	-	-	-	-	-	Eh
MALVACEAE											
<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>	LS	PE	-	2	-	-	-	-	6v	-	
<i>Abutilon tubulosum</i>	LS	PE	-	2	-	-	-	-	6v	-	
<i>Hibiscus sturtii</i> var. <i>sturtii</i>	LS	PE	-	-	-	4	-	-	6v	-	
* <i>Hibiscus trionum</i> var. <i>trionum</i>	F	SP	-	-	-	-	-	-	-	-	Dfv
‡* <i>Malva parviflora</i>	F	AN	1	-	3	4	-	6	7v	8	
* <i>Malvastrum americanum</i>	F	SP	-	-	3	-	-	-	6v	-	
* <i>Modiola caroliniana</i>	F	SP	1	2	-	4	-	6v	7	8	
* <i>Pavonia hastata</i>	LS	PE	1	2v	-	-	5v	-	-	8	
‡ <i>Sida atherophora</i>	LS	PE	-	-	-	-	5v	-	-	-	
<i>Sida corrugata</i>	F	PE	1	-	3	4	5	6v	7	8	
<i>Sida cunninghamii</i>	F	PE	-	-	3	4	-	6v	-	-	
* <i>Sida rhombifolia</i>	LS	PE	-	-	-	4	5v	6	-	-	
* <i>Sida spinosa</i>	LS	PE	-	-	3v	-	-	-	-	-	
<i>Sida subspicata</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Sida trichopoda</i>	F	PE	-	-	-	-	-	-	7v	-	
MELIACEAE											
† <i>Melia azedarach</i> var. <i>australasica</i>	T	PE	-	-	3	4	5	6v	-	-	
MENISPERMACEAE											
<i>Stephania japonica</i> var. <i>discolor</i>	C	PE	-	2v	-	-	-	-	-	-	
MONIMIACEAE											
‡ <i>Daphnandra</i> sp. A	PE		-	-	-	-	-	-	-	-	Ehv
MORACEAE											
‡* <i>Ficus carica</i>	T	PE	1	-	-	-	-	6v	-	8	
<i>Ficus coronata</i>	T	PE	-	-	-	-	-	-	-	-	Ehv
<i>Ficus rubiginosa</i>	T	PE	1	2	3	4	5	6v	-	-	
MYOPORACEAE											
<i>Eremophila debilis</i>	F	PE	1	-	-	-	-	6v	7	-	
<i>Myoporum montanum</i>	LS	PE	-	2	-	4v	-	6v	-	-	
MYRTACEAE											
<i>Angophora floribunda</i>	T	PE	1	2	3	4	5	6v	-	8	
<i>Callistemon sieberi</i>	TS	PE	-	2v	-	-	-	-	-	-	
‡ <i>Callistemon</i> sp. (unnamed)	TS	PE	1v	-	-	-	-	-	-	-	
<i>Calytrix tetragona</i>	LS	PE	-	2v	-	-	-	-	-	8v	
<i>Eucalyptus albens</i>	T	PE	-	2	3	4	-	6v	7	8	
<i>Eucalyptus albens</i> – <i>E. moluccana</i> intermediate	T	PE	-	-	-	-	-	-	-	-	Egv
<i>Eucalyptus blakelyi</i>	T	PE	-	-	-	4	-	6v	-	8	
<i>Eucalyptus bridgesiana</i> – <i>E. malacoxylon</i> intermediate	T	PE	-	-	-	-	-	-	-	-	Ehv
<i>Eucalyptus caleyi</i> subsp. <i>caleyi</i>	T	PE	-	2v	-	4	-	-	-	8v	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Portulaca</i> sp.	F	AN	-	2v	-	-	-	-	-	-	
PRIMULACEAE											
* <i>Anagallis arvensis</i> blue-flowered form	F	SP	1	2	3	4	5	6v	7	-	
* <i>Anagallis arvensis</i> red-flowered form	F	SP	1	2	3	4	-	6v	7	8	
‡ <i>Samolus valerandi</i>	F	PE	1v	-	-	-	-	-	-	-	
PROTEACEAE											
<i>Grevillea floribunda</i>	LS	PE	-	2v	-	-	-	-	-	-	
† <i>Grevillea robusta</i>	T	PE	-	-	-	-	5	6v	-	8	
<i>Grevillea triternata</i>	LS	PE	-	2v	-	-	-	-	-	-	
<i>Hakea eriantha</i>	TS	PE	-	2v	-	-	-	-	-	-	
<i>Hakea pulvinifera</i>	TS	PE	-	-	-	-	-	-	-	-	Aev
<i>Persoonia cornifolia</i>	TS	PE	-	2v	-	-	-	-	-	-	
RANUNCULACEAE											
* <i>Adonis microcarpa</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
<i>Clematis glycinoides</i> var. <i>glycinoides</i>	C	PE	-	2	-	4	5	6v	-	8	
<i>Clematis microphylla</i> var. <i>microphylla</i>	C	PE	-	2	3	-	-	6v	-	8	
<i>Ranunculus lappaceus</i>	F	PE	1v	2	-	4v	-	6v	-	8	
<i>Ranunculus pumilio</i> var. <i>pumilio</i>	F	AN	-	-	-	4v	-	-	-	-	
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	F	AN	1	2	-	4v	5	6v	-	8	
<i>Ranunculus</i> sp. A (aff. <i>undosus</i>)	F	AN	1v	-	-	4	-	-	-	-	
RESEDACEAE											
* <i>Reseda lutea</i>	F	PE	-	-	-	-	-	-	-	-	Df
* <i>Reseda luteola</i>	F	PE	-	-	-	-	-	-	-	-	Egv
RHAMNACEAE											
<i>Alphitonia excelsa</i>	T	PE	-	2	3	4v	-	-	-	-	
<i>Cryptandra amara</i> var. <i>amara</i>	LS	PE	1	-	-	-	-	-	-	8v	
<i>Cryptandra amara</i> var. <i>longiflora</i>	LS	PE	-	-	-	-	-	-	-	-	Egv
<i>Cryptandra scortechinii</i>	LS	PE	1v	-	-	-	-	-	-	-	
<i>Pomaderris angustifolia</i>	TS	PE	-	2v	-	-	-	-	-	-	
<i>Pomaderris eriocephala</i>	TS	PE	1v	-	-	-	-	-	-	-	
ROSACEAE (s. str.)											
<i>Acaena novae-zelandiae</i>	F	PE	-	-	-	-	-	6v	-	8	
<i>Acaena ovina</i> s. str.	F	PE	-	-	-	-	-	6v	-	8	
* <i>Aphanes arvensis</i>	F	AN	-	-	-	-	-	-	-	-	Ehv
<i>Aphanes australiana</i>	F	AN	-	2v	-	4v	5	6v	-	8	
* <i>Rosa rubiginosa</i>	LS	PE	1	2	-	4	5	6v	-	8	
‡* <i>Rosa</i> sp.	LS	PE	-	-	-	-	-	6v	-	-	
* <i>Rubus discolor</i>	LS	PE	1	2	-	4	5	-	-	8v	
<i>Rubus parvifolius</i>	LS	PE	1	2	3	4	5	6v	-	8	
* <i>Sanguisorba minor</i> subsp. <i>muricata</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
RUBIACEAE											
<i>Asperula conferta</i>	F	PE	-	2	-	4v	-	6v	7	8	
<i>Asperula cunninghamii</i>	F	PE	1v	-	-	-	-	-	-	-	
<i>Canthium odoratum</i>	T	PE	-	2	3	4	-	6v	-	-	
<i>Canthium oleifolium</i>	T	PE	1v	-	-	-	-	-	-	-	
* <i>Galium aparine</i>	F	AN	-	2	3	4	5	6v	7	8	
<i>Galium gaudichaudii</i>	F	PE	-	2	3	4v	5	6v	-	8	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Galium migrans</i>	F	PE	1	2	3	4v	5	6v	-	8	
* <i>Galium murale</i>	F	AN	1v	2	-	4	-	6v	-	8	
<i>Opercularia diphylla</i>	F	PE	-	-	-	-	-	-	-	-	Ehv
<i>Opercularia hispida</i>	F	PE	-	2	-	4v	-	-	-	-	
<i>Pomax umbellata</i>	LS	PE	-	2v	-	-	-	-	-	-	
* <i>Richardia stellaris</i>	F	PE	-	2v	-	-	-	-	-	-	
* <i>Sherardia arvensis</i>	F	AN	-	-	-	-	-	6v	-	8v	
RUTACEAE											
<i>Boronia ruppilii</i> s. str.	LS	PE	1v	-	-	-	-	-	-	-	
* <i>Citrus limonia</i> s. lat.	T	PE	-	-	-	-	-	6	-	-	
<i>Correa reflexa</i> var. <i>reflexa</i>	LS	PE	-	2	-	4v	-	-	-	-	
<i>Geijera parviflora</i>	TS	PE	-	-	3	-	-	-	-	-	Dfv
‡ <i>Melicope micrococca</i>	T	PE	-	-	-	-	-	-	-	-	Ehv
<i>Zieria cystisoides</i>	LS	PE	-	-	-	-	-	-	-	8v	
SALICACEAE											
‡* <i>Populus alba</i>	T	PE	-	-	-	-	-	-	-	-	Dfv
* <i>Populus nigra</i>	T	PE	-	-	-	-	-	-	-	-	Ehv
‡* <i>Salix fragilis</i> var. <i>fragilis</i>	T	PE	-	-	-	-	-	-	-	-	Dfv
‡* <i>Salix</i> × <i>sepulcralis</i> var. <i>sepulcralis</i> (<i>Salix babylonicus</i> misapplied)	T	PE	-	2v	-	-	-	-	-	8	
‡* <i>Salix</i> × <i>sepulcralis</i> var. <i>sepulcralis</i> × <i>Salix fragilis</i> var. <i>fragilis</i>	T	PE	-	2v	-	-	-	-	-	-	
SAMBUCACEAE											
<i>Sambucus australasica</i>	LS	PE	-	-	-	-	-	6v	-	-	
SANTALACEAE											
<i>Exocarpos cupressiformis</i>	HP	PE	-	2	-	4	-	6v	-	8	
<i>Santalum lanceolatum</i>	HP	PE	1	-	3v	-	-	6	-	8	
SAPINDACEAE											
<i>Alectryon forsythii</i>	TS	PE	-	-	-	-	-	6v	-	-	
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>	T	PE	-	-	-	-	-	-	-	-	Dev
* <i>Cardiospermum grandiflorum</i>	C	PE	-	-	-	-	-	6v	-	-	
<i>Dodonaea boroniifolia</i>	LS	PE	1v	-	-	-	-	-	-	-	
<i>Dodonaea sinuolata</i> subsp. <i>sinuolata</i>	LS	PE	-	-	-	-	-	-	-	-	Ehv
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>	TS	PE	1	2	3	4	-	6v	-	8	
<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>	TS	PE	-	2	-	4v	-	-	-	-	
SCROPHULARIACEAE											
<i>Derwentia arenaria</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Glossostigma elatinooides</i>	F	PE	-	2v	-	-	-	-	-	-	
‡ <i>Gratiola pedunculata</i>	F	PE	-	2v	-	-	-	-	-	-	
<i>Gratiola peruviana</i>	F	PE	-	2v	-	-	-	-	-	-	
* <i>Kickxia spuria</i> subsp. <i>integrifolia</i>	F	PE	-	-	-	-	-	-	-	-	Cfv
<i>Limosella australis</i>	F	PE	-	-	-	4v	-	-	-	-	
<i>Limosella curdieana</i>	F	PE	-	-	-	4v	-	-	-	-	
* <i>Linaria arvensis</i>	F	AN	1	2v	3	4	5	6v	-	8	
* <i>Linaria pelisseriana</i>	F	AN	-	2v	-	4v	5	-	-	-	

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Mimulus gracilis</i>	F	PE	1v	-	-	4v	-	-	-	-	
‡ <i>Mimulus repens</i>	F	PE	-	2v	-	-	-	-	-	-	
* <i>Misopates orontium</i>	F	AN	-	2	3	4	5	6v	-	8	
‡ <i>Striga parviflora</i>	P	AN	-	-	-	-	-	-	-	-	Ehv
* <i>Verbascum thapsus</i> subsp. <i>thapsus</i>	F	SP	1	2	-	4	5	6	-	8	
* <i>Verbascum virgatum</i>	F	SP	1	2	3	4	5	6v	-	8	
‡* <i>Veronica anagallis-aquatica</i>	F	PE	1v	-	-	-	-	-	-	-	
* <i>Veronica arvensis</i>	F	AN	1	2v	-	4	5	6v	-	8	
* <i>Veronica persica</i>	F	AN	-	-	3	-	-	6v	-	8	
<i>Veronica plebeia</i>	F	PE	1	2	3	4	-	6v	-	8	
SIMAROUBACEAE											
* <i>Ailanthus altissima</i>	T	PE	1	-	3	4	-	6v	-	8	
SOLANACEAE											
* <i>Calibrachoa parviflora</i>	F	SP	-	-	-	-	-	-	-	-	Bev
* <i>Cestrum parqui</i>	LS	PE	-	-	-	-	5	6v	-	-	
* <i>Datura ferox</i>	F	AN	-	2	3	-	-	6v	-	8	
* <i>Datura stramonium</i>	F	AN	1	2	3	-	-	6v	7	8	
* <i>Lycium ferocissimum</i>	TS	PE	-	-	-	-	5	6v	-	-	
* <i>Nicotiana glauca</i>	TS	PE	-	-	3v	-	-	-	-	-	
<i>Nicotiana suaveolens</i>	F	PE	1v	-	-	-	-	-	-	-	
* <i>Petunia axillaris</i>	F	SP	-	-	-	-	-	6v	-	-	
* <i>Physalis ixocarpa</i>	F	AN	-	-	3v	-	-	-	7v	-	
* <i>Physalis virginiana</i>	F	PE	-	-	-	-	-	-	-	-	Cev
‡* <i>Solanum chenopodioides</i>	F	AN	1v	2	-	-	5v	-	-	-	
<i>Solanum cinereum</i>	F	PE	1	2v	3	4v	5	6	-	-	
* <i>Solanum elaeagnifolium</i>	F	PE	-	-	-	-	-	-	-	-	Dfv
<i>Solanum esuriale</i>	F	PE	-	-	-	-	-	-	7v	-	
* <i>Solanum nigrum</i>	F	SP	1	2	3	4	5	6	7	8v	
<i>Solanum opacum</i>	F	AN	-	2	-	-	-	-	-	-	
<i>Solanum parvifolium</i>	LS	PE	-	2v	-	4v	-	6v	-	-	
<i>Solanum prinophyllum</i>	F	SP	-	-	-	-	-	-	-	8v	
* <i>Solanum pseudocapsicum</i>	LS	PE	-	-	3	-	-	6v	-	8	
‡* <i>Solanum radicans</i>	F	SP	-	-	-	-	-	-	-	-	Dfv
* <i>Solanum rostratum</i>	F	AN	-	-	-	-	-	-	-	-	Cev-
* <i>Solanum triflorum</i>	F	AN	-	-	-	-	-	-	-	-	Dfv
<i>Solanum vescum</i>	LS	PE	-	-	-	-	-	-	-	-	Ddv
STACKHOUSIACEAE											
<i>Stackhousia monogyna</i>	F	PE	1	2v	3	4	-	6v	-	8	
<i>Stackhousia viminea</i>	F	PE	1v	2	-	4v	5	6v	7	-	
STERCULIACEAE											
<i>Brachychiton populneus</i>	T	PE	1	2	3	4	5	6v	-	8	
THYMELAEACEAE											
<i>Pimelea curviflora</i> var. <i>divergens</i>	LS	PE	-	-	-	-	-	6v	-	-	
<i>Pimelea curviflora</i> var. <i>sericea</i>	LS	PE	-	2v	-	4	-	-	-	-	
<i>Pimelea linifolia</i> subsp. <i>linifolia</i>	LS	PE	1v	-	-	-	-	6v	-	8v	
<i>Pimelea micrantha</i>	LS	PE	-	-	3	-	-	6v	-	-	
<i>Pimelea neo-anglica</i>	LS	PE	1v	2v	-	4	-	-	7v	-	
<i>Pimelea strigosa</i>	LS	PE	-	2v	-	4v	-	6v	-	-	
ULMACEAE											
‡* <i>Celtis australis</i>	T	PE	-	-	-	-	-	6v	-	-	
<i>Trema aspera</i>	TS	PE	-	2v	-	-	-	-	-	-	
URTICACEAE											

Species	Life form	Life cycle	Site								Other
			1	2	3	4	5	6	7	8	
<i>Parietaria debilis</i>	F	AN	-	2v	-	4v	-	6v	-	8	
* <i>Parietaria judaica</i>	F	PE	-	-	-	-	-	-	-	-	Df
<i>Urtica incisa</i>	F	PE	1	2	3	4	5	6v	7	8	
* <i>Urtica urens</i>	F	PE	-	2	3	-	5	-	7	8	Dfv
VALERIANACEAE											
* <i>Centranthus ruber</i> subsp. <i>ruber</i>	F	PE	-	-	-	-	-	6v	-	-	
VERBENACEAE											
* <i>Lantana montevidensis</i>	F	PE	-	-	-	-	-	6v	-	-	
<i>Oncinocalyx betchei</i>	F	PE	-	-	-	4	5	6v	-	8	
‡* <i>Phyla canescens</i>	F	PE	-	-	-	-	-	-	-	-	Aev
* <i>Verbena aristigera</i> (= <i>V. tenuisecta</i>)	F	PE	-	-	3	4	5	6v	-	-	
* <i>Verbena bonariensis</i>	F	PE	-	2	-	-	-	-	-	8v	
‡* <i>Verbena caracasana</i>	F	PE	-	2	-	4	5	6v	-	8	
<i>Verbena gaudichaudii</i> (previously confused with <i>V. officinalis</i>)	F	PE	-	2	3	-	5	6v	-	8	
* <i>Verbena hispida</i>	F	PE	-	-	-	-	-	-	-	-	Egv
‡* <i>Verbena incompta</i> (previously included in <i>V. bonariensis</i>)	F	PE	1	2v	3	4	5	6v	7	8	
‡* <i>Verbena quadrangularis</i> (= <i>V. brasiliensis</i>)	F	PE	-	-	-	-	-	6v	-	-	
* <i>Verbena rigida</i>	F	PE	1	-	-	-	5	-	-	-	Cbv
VIOLACEAE											
<i>Hybanthus monopetalus</i>	F	PE	-	-	-	-	-	-	-	-	Eiv
<i>Hymenanthera dentata</i>	TS	PE	-	-	-	-	-	-	-	-	Fgv
‡* <i>Viola arvensis</i>	F	PE	-	-	-	-	-	6	-	-	
<i>Viola betonicifolia</i> subsp. <i>betonicifolia</i>	F	PE	1v	2v	-	4	-	-	-	8	
* <i>Viola odorata</i>	F	PE	-	-	-	-	-	6v	-	-	
VISCACEAE											
<i>Korthalsella rubra</i> subsp. <i>geijericola</i>	P	PE	-	-	-	-	-	-	-	-	Bfv
<i>Notothixos cornifolius</i>	P	PE	-	2v	-	4	-	6	-	8v	
<i>Notothixos subaureus</i>	P	PE	-	-	-	-	-	-	-	-	Ehv
VITACEAE											
<i>Cayratia clematidea</i>	C	PE	-	2	3	4	-	6v	-	-	
<i>Cissus opaca</i>	C	PE	-	-	3	4	-	6v	-	-	
ZYGOPHYLLACEAE											
<i>Tribulus micrococccus</i>	F	AN	1	2	3	-	-	6	7	8	Dfv
* <i>Tribulus terrestris</i>	F	AN	1	2	3	4	5	6v	7	8	

2. Warrabah National Park

Warrabah National Park covers 3471 hectares of the Namoi River valley, to the east of Manilla. Surveys were undertaken only in the western half of the Park (between 30°32'S and 30°35'S and 150°54'E and 150°57'E), due to problems of access elsewhere. Altitude varied from 425 m to 900 m. The Park is on New England adamellites (granitic rocks), which weather to produce a well-drained, coarse to fine sandy and infertile soil.

Eucalypt woodland to open-forest communities predominate with *Casuarina cunninghamiana* subsp. *cunninghamiana* growing along the river, and *Callitris glaucophylla* common on the slopes, along with several species of *Eucalyptus* (Fig. 3). The shrub understorey varies from sparse to dense, with particularly dense growth of *Leptospermum brevipes* on slopes above the river and *Cassinia laevis* in other areas. Perennial grasses dominate the ground layer and there are often extensive bare areas during drier periods.

3. Attunga rubbish tip

The area sampled (between 30°53'S and 30°55'S and 150°54'E and 150°57'E) covered 18 hectares around Attunga rubbish tip and included the adjoining roadside. Altitude varied from 430 m to 488 m. The area is particularly disturbed with fires often escaping from the tip and burning the surrounding vegetation. Soil in this area is derived from limestone, the tip being an old limestone mine. Vegetation of the area is mainly tall shrubs and herbs with scattered trees of *Eucalyptus albens*, *Angophora floribunda* and *Ficus rubiginosa* as well as small areas of *Eucalyptus albens* woodland (Fig. 4). Low growing species are increasingly being displaced by *Hyparrhenia hirta*.

4. Attunga State Forest

Attunga State Forest covers 850 hectares (between 30°55'S and 30°58'S and 150°49'E and 150°51'E). Altitude varied from 430 m to 940 m. All areas of the forest were sampled. Soil is coarse to fine sand derived from Moonbi and Walcha Road adamellites (granitic rocks). An area previously used for gravel extraction appears to have a high clay content as pools of water with ephemeral wetland species remain in this area for a few weeks after heavy rain.

Vegetation consists mainly of grassy woodland, shrubby or layered woodland and some areas of grassy open-forest (Fig. 5). *Callitris glaucophylla*, *Angophora floribunda* and several *Eucalyptus* species are dominant in flat and gently-sloping areas, as well as on lower slopes not having a westerly aspect; *Callitris glaucophylla* is dominant on lower western-facing slopes and *Eucalyptus laevopinea* dominant in higher parts. The shrub understorey varies from absent to closed (> 70 per cent projective foliage cover) with locally conspicuous stands of *Cassinia laevis*, *Olearia elliptica* and *Dodonaea viscosa* subsp. *angustissima*. Amongst trees, shrubs and rocks, low-growing species are often sparse. An intermittent stream runs through the northern part of the forest with associated riparian communities.



Fig. 4. The area around Attunga Rubbish Tip consists of dense stands of shrubs with some *Eucalyptus albens* woodland. The area is being increasingly invaded by the introduced grass, *Hyparrhenia hirta* (Site 3).



Fig. 5. Woodland of *Eucalyptus albens* with an understorey of *Callitris glaucophylla*, *Cassinia laevis* and herbs at Attunga State Forest (Site 4).

Recreational use of the forest has changed considerably during the survey period. From 1984 until the early 1990s the forest was used by day trippers from Tamworth. However, in the early 1990s trail-bike riding became popular causing significant erosion. In late 1994 New England Archery Club fenced off part of the western side of the forest (the main point of entry) and consequently discouraged both trail bike riding and bushwalking in the area.

5. Kootingal

The area sampled was grazing and cropping land (between 31°04'S and 31°05'S and 151°02'E and 151°03'E), covering approximately 14 hectares of weed-infested unimproved pasture with some areas of open-woodland (Fig. 6), and includes areas previously cropped and the roadside outside the property. Altitude varied from 415 m to 455 m. Soils are coarse to fine sands derived from Moonbi and Walcha Road adamellites. The grassy open-woodland in rocky sites is dominated by *Eucalyptus dealbata* with a sparse shrub understorey. Dominant species of ground flora include *Hyparrhenia hirta* in the rockier areas and *Aristida ramosa* on lower uncultivated land. Plant species occurring in previously cultivated areas (about half of the sample area) include *Cynodon dactylon*, *Urochloa piligera* and exotics such as *Echium plantagineum*, *Carthamus lanatus*, *Hypochaeris radicata*, *Trifolium* spp. and *Tribulus terrestris*. This area has recently been subdivided into rural residential blocks of a few hectares each.



Fig. 6. Open-woodland of *Eucalyptus dealbata* with scattered *Callitris glaucophylla* on grazing land near Kootingal. The herb layer is being invaded by *Hyparrhenia hirta* which is visible in the foreground (Site 5).

6. Oxley Park, Tamworth

Oxley Park covers 521 hectares (between 31°04'S and 31°07'S and 150°56'E and 150°59'E), on hills to the north of Tamworth. Altitude varied from 400 m to 831 m. All areas of the Park were sampled. Soil is a red to brown loam derived from greywacke (compressed sediments).

Woodland to open-forest communities are dominated by *Eucalyptus albens* (Fig. 7) with *Callitris glaucophylla* locally common along the western side of the Park. The shrub layer is often poorly developed. *Cassinia quinquefaria*, *Olearia elliptica*, *Olearia viscidula*, *Dodonaea viscosa* subsp. *angustifolia* and *Acacia decora* are locally common. The ground flora is diverse with *Aristida ramosa* being one of the more common species. Some of the sheltered gullies have dry rainforest species forming vine thickets. Further floristic information is provided in Hosking (1990).



Fig. 7. Oxley Park is predominantly *Eucalyptus albens* woodland to open-forest (Site 6).

7. Duri

The area sampled was a roadside 10 km north west of Duri, comprising about 3 hectares on both sides of 1 km of road (from 31°09'53"S, 150°44'43"E to 31°09'43"S, 150°44'03"E). Altitude varied from 460 m to 470 m. The soil is a black cracking clay.

The area is predominantly grassland with occasional shrubs of *Acacia implexa* and *Acacia salicina*, and scattered trees of *Eucalyptus albens* and **Schinus areira* (Fig. 8). The ground flora is dominated by grasses with *Dichanthium setosum* being particularly common. **Hyparrhenia hirta* is beginning to encroach on the western end of the area sampled. Roadside grading of this area in 1995 removed much of the original herb layer and the area now appears to have a greater proportion of introduced species.

8. Chaffey Dam

The area sampled comprised about 210 hectares on the northern side of Chaffey Dam (between 31°20'S and 31°21'S and 151°07'E and 150°09'E), including the jasper ridge that was extended to form the wall for the dam. Plant species growing alongside the Peel River in the area below the dam wall are also included. Altitude varied from 485 m to 712 m. Jasper weathers to form a well-drained red to brown loam.

The site consists of woodland to open-forest (Fig. 9) with some areas of grassland. The southern slopes are dominated by *Eucalyptus laevopinea* with a sparse understorey of shrubs with *Acacia implexa* as the most common species. The ground flora is dominated by grasses with *Aristida ramosa* being particularly common. Northern slopes support *Eucalyptus albens* woodland, similar to that found in Oxley Park.

Prior to construction of Chaffey Dam the area was grazing land, but now much of the area is only grazed by native animals and rabbits. A report by White et al. (1990) on vegetation which would be flooded by an enlargement of Chaffey Dam covers some of the vegetation in lower parts of this study area, but also covers areas not included in the present study.

Results and Discussion

Table 2 lists vascular plant taxa for the study area. A total of 1041 taxa was recorded (639 native to area, 8 Australian but not native to area, 394 exotic) representing 11% of the native taxa and 30% of the exotic naturalised taxa of New South Wales (based on taxa in Harden 1990–93, see Table 3). The plant families with greatest representation within the study area are Poaceae, Asteraceae and Fabaceae (Table 4). The number of taxa recorded at each site is shown in Table 5. Species richness increased with size of site sampled and habitat diversity, with Warrabah National Park, the largest (3741 ha) and most diverse of the eight sites, with 507 plant taxa, and the roadside north west of Duri (3 ha) with only 183 taxa.



Fig. 8. Roadside area north west of Duri consisting of grassland with occasional shrubs of *Acacia implexa* and *Acacia salicina* and a few *Eucalyptus albens* trees (Site 7).



Fig. 9. Woodland to open-forest of *Eucalyptus laevopinea* with *Acacia implexa* as the main understorey shrub on a ridge to the north of Chaffey Dam (Site 8).

Table 3. Number of vascular plant taxa found in this study in relation to the vascular plant taxa of New South Wales (Harden 1990–93).

Plant group	No. native taxa (species)		No. exotic taxa (species)		Total taxa (species)	
	NWS ¹	NSW ²	NWS ¹	NSW ²	NWS ¹	NSW ²
Pteridophytes	16 (16)	183 (180)	-	4 (4)	16 (16)	187 (184)
Gymnosperms	3 (3)	31 (28)	1 (1)	4 (4)	4 (4)	35 (32)
Angiosperms (Monocotyledons)	203 (194)	1376 (1316)	97 (96)	329 (317)	300 (290)	1705 (1633)
Angiosperms (Dicotyledons)	425 (413)	4094 (3755)	296 (293)	987 (968)	721 (706)	5081 (4723)
Total	647 (626)	5684 (5279)	394 (390)	1324 (1293)	1041 (1016)	7008 (6572)

¹NWS = North Western Slopes in this study

²NSW = New South Wales from Harden (1990–93)

Table 4. Plant families with 10 or more taxa in the study area showing the numbers and proportions of native and naturalised exotic species.

Family	Total no. of taxa	No. of native taxa	% of native taxa	No. of exotic taxa	% of exotic taxa
Poaceae	156	87	55.8	69	44.2
Asteraceae	118	66	55.9	52	44.1
Fabaceae	96	61	63.5	35	36.5
Cyperaceae	45	40	88.9	5	11.1
Myrtaceae	29	29	100.0	0	0
Solanaceae	23	7	30.4	16	69.6
Orchidaceae	22	22	100.0	0	0
Caryophyllaceae	19	4	21.1	15	78.9
Scrophulariaceae	19	10	52.6	9	47.4
Euphorbiaceae	18	14	77.8	4	22.2
Juncaceae	18	15	83.3	3	16.7
Brassicaceae	17	5	29.4	12	70.6
Lamiaceae	17	11	64.7	6	35.3
Polygonaceae	16	7	43.7	9	56.3
Malvaceae	15	8	53.3	7	46.6
Chenopodiaceae	14	12	85.7	2	14.3
Rubiaceae	13	9	69.2	4	30.8
Apiaceae	11	5	45.5	6	54.5
Verbenaceae	11	2	18.2	9	81.8
Amaranthaceae	10	5	50.0	5	50.0
Boraginaceae	10	5	50.0	5	50.0
Loranthaceae	10	10	100.0	0	0
Malaceae	10	0	0	10	100.0

Table 5. Summary of site details and number of vascular plant taxa at each site and overall in this study, showing the number of native and naturalised exotic taxa.

Site	Substrate; soil	Vegetation	Landuse	Area of site (ha)	Total no. of taxa	No. of native taxa (%)	No. of exotic taxa (%)
1 around Woodsreef (38)	mainly serpentinite; mine	mainly grassy grey to brown loam	mostly grazing with <i>Eucalyptus</i> sp. (unnamed stringybark) woodland	150 ungrazed roadside areas	382	238	144 (62)
2 Warrah National Park	New England adamellites; mainly grey to brown	various woodland to open-forest sandy soil	recreation and conservation — communities	3471 previously rough grazing	507	351 (69)	156 (31)
3 around Attunga rubbish tip	limestone; grey to brown loam	mostly shrubland with some <i>Eucalyptus</i>	rubbish tip and ungrazed surrounds <i>albens</i> woodland	18	266	134 (50)	132 (50)
4. Attunga State Forest	Moonbi and Walcha Road adamellites; mainly grey to brown sandy soil	various woodland to open-forest communities	mainly recreation	850	410	266 (65)	144 (35)
5. grazing land near Kootingal	Moonbi and Walcha Road adamellites; mainly grey to brown sandy soil	grassy <i>Eucalyptus dealbata</i> open-woodland and cleared grazing and cropping	grazing, previously also cropping, and roadside areas	14	265	135 (51)	13 (49)
6. Oxley Park Tamworth	greywacke; red to brown	mainly <i>Eucalyptus</i> <i>albens</i> woodland to sometimes skeletal	recreation and conservation open-forest	521	467	248 (53)	219 (47)
7 roadside north west of Duri	no substrate visible; black cracking clay soil	predominantly grassland	roadside only grazed during droughts	3	183	89 (49)	94 (51)
8. northern side of Chaffey Dam	mainly jasper; red to brown	mainly woodland to open- forest with <i>Eucalyptus</i> loam	recreation, previously grazing <i>albens</i> and <i>Eucalyptus</i> <i>laevopinea</i> as the most common trees	210	406	232 (57)	174 (43)
Total for area				620,000	1041	647 (62)	394 (38)

Despite the long history of disturbance, a high number of native species was recorded (626), comprising 62% of the total number of species. This species richness reflects the diversity of landforms, geology and climate within the region as well as the natural resilience of many of the native species. The highest number of native taxa was found in Warrabah National Park (351 taxa) and Attunga State Forest (266 taxa).

The primary survey sites covered a range of soil types. A number of species were found at all these sites and others appeared to be confined to particular soil types, for example, those on serpentinite soils in the Woodsreef area. The most fertile sites, Duri (site 7), Chaffey Dam (site 8) and Oxley Park (site 6) were also some of the most disturbed and recorded high numbers of exotic taxa (> 40%). The importance of roadside corridors in protecting local biodiversity is supported by the floristics of site 7, west of Duri. Within an area of 3 ha there were 89 native taxa recorded, including two species of national and state significance.

Exotic taxa

About 38% of the plant taxa recorded are exotics naturalised in the area. This is a relatively high proportion in comparison with figures of almost 19% for flora of New South Wales (Harden 1990–93), 28% for Victoria (Carr 1993) and almost 27% for South Australia (Toelken 1987). A study of species mainly occurring along roadsides from Duri Peak (south west of site 7) to 'Head of Peel' (south of site 8 and on the edge of the Northern Tablelands) by Jurjens (1974) listed 502 species of which 37% were exotics. The similar proportions of exotic taxa found in Jurjens study and this recent survey suggest that the establishment of exotic species largely pre-dates 1974 and that there has been little change in relative proportions since that time. The study by White et al. (1990) around Chaffey Dam listed 328 species, of which 37% were exotic, which is comparable to the 43% found in our study of the northern side of Chaffey Dam (site 8). As a regional comparison detailed surveys of various sites in the Wagga Wagga district (South Western Slopes) of New South Wales, well to the south of this survey, indicate that the proportion of exotics in that area is around 28% (G. Burrows pers. comm.).

The relatively high number of exotic taxa recorded in the present study, particularly in the families Poaceae, Asteraceae and Fabaceae, reflects a long history of settlement and agriculture in the area including the widespread use of introduced grasses and legumes as pasture species. It may also reflect a high representation of disturbed sites. The area has a mix of winter and summer crops and their associated weeds. This has meant that introduced species have come from a range of climatic areas, from Mediterranean to sub-tropical.

The invasion of exotic species is closely associated with livestock grazing, soil disturbance, and reduction in cover of perennial species (McIntyre & Lavorel 1994, McIntyre et al. 1995, Pettit et al. 1995). This is reflected in the survey with the lowest percentage of exotic taxa recorded for Warrabah National Park (31%) while roadsides (site 7), grazing land (site 5) and the area around a tip (site 3) are close to 50%. The high proportion of exotic taxa in Oxley Park (47%) probably reflects the close proximity of Tamworth along the south-western boundary of the Park. Increasing use of Warrabah

National Park by campers and day visitors has also resulted in establishment of additional exotic species, particularly in the most heavily used areas. **Hyparrhenia hirta*, **Cenchrus incertus*, **Sporobolus africanus* var. *capensis*, **Centaurea melitensis* and **Richardia stellaris* are a few of the species that have established in the Park over recent years.

The threat of invasion and replacement of native species by introduced species is a serious problem. One species of particular concern is **Hyparrhenia hirta*, Coolatai Grass, which appears to be spreading and dominating many roadside areas. This species is difficult to control using herbicides and, if kept short and vegetative, appears to be a productive and palatable pasture species. In trials, **Hyparrhenia hirta* supported stocking rates of 20–37 dry sheep equivalents/ha over a 20-month period (Lodge et al. 1994). Two other species **Euphorbia davidii* and **Sida spinosa* appear to be increasing in roadside areas around Tamworth.

Taxa of conservation significance

(i) Rare or Threatened Australian Plants (ROTAP) and plants listed under the Threatened Species Conservation Act (T.S.C. Act 1995)

There are six species recorded within the study area currently listed as nationally Rare or Threatened Australian Plants (ROTAP) (Briggs & Leigh 1996): *Bothriochloa biloba* (3V), *Tylophora linearis* (3E), *Picris eichleri* (3KC-), *Hakea pulvinifera* (2ECi), *Derwentia arenaria* (3RC-) and *Euphrasia ruptura* (1X- *Euphrasia* sp. 1 [Tamworth] in Briggs & Leigh 1996). An additional species of state significance and listed as vulnerable under the Threatened Species Conservation Act (T.S.C. Act 1995) is *Dichanthium setosum* (*Bothriochloa biloba*, *Tylophora linearis*, *Hakea pulvinifera* and *Euphrasia ruptura* are also listed under the T.S.C. Act 1995). The grass *Bothriochloa biloba* has a relatively widespread distribution in northern New South Wales, however, it is generally uncommon and most of the records for the North Western Slopes (chiefly Warialda district) date back to the early to mid 1900s. Within the study area this species has been recorded from a roadside west of Duri (site 7), from black cracking clay soils, growing with another listed species *Dichanthium setosum*. This *Dichanthium* is also recorded from Attunga rubbish tip, Oxley Park and Chaffey Dam and is generally common within the study area. Other herbarium records for the North Western Slopes are pre-1940, the largest number of previous collections of this taxon being from the Northern Tablelands. *Tylophora linearis* (Asclepiadaceae) has been recorded from Crow Mountain (between Site 1 and Site 2 of Fig. 1). This species was not seen during this study and has not been included in Table 2 or the analyses. *Picris eichleri* (Asteraceae) has been recorded from three widely separated locations during this study. At Woodsreef many thousands of plants were present. These populations appear not to be adversely affected by grazing of the areas. All other herbarium records of this species are from the Northern Tablelands, many of which date back to the early 1900s with only one other recent record from Mount Kaputar National Park. This species may be more common, however, as it has been previously confused with **Picris hieracioides*. *Hakea pulvinifera* (Proteaceae) is restricted to a rocky hillside below Keepit Dam in Keepit State Recreation Area (Benson 1988). Although flowering (Fig. 10), fruiting has not

been observed in this population. *Derwentia arenaria* (Scrophulariaceae) was found growing over one ridge and neighbouring slopes in Warrabah National Park, with most other records for the North Western Slopes being from the Warrumbungle Ranges. Large populations of this species have recently been reported from within and outside Warrabah National Park (P. Davies pers. comm.) and this species is also known to occur further south at Mendooran and in the Goulburn River National Park (Central Western Slopes). *Euphrasia ruptura* (Scrophulariaceae) has only been recorded from the Tamworth area where it was collected by H.M.R. Rupp in 1904 but has not been collected since (Barker 1997). This species was not seen during this study and has not been included in Table 2 or the analyses.

(ii) Significant plants from serpentinite areas

The serpentinite areas at Woodsreef and east of Chaffey Dam are of particular interest with a high concentration of significant species including several undescribed taxa. New taxa of *Homopholis* (Poaceae), *Hovea* (Fabaceae) and *Callistemon* (Myrtaceae), currently being described, may warrant listing as ROTAPS and/or under the T.S.C. Act (1995) on further investigation. Undescribed species of *Dianella* (Phormiaceae), *Minuria* (Asteraceae) and *Glycine* (Fabaceae) may also be restricted to serpentinite areas. The dominant eucalypt at Woodsreef and east of Chaffey Dam, previously identified as *Eucalyptus macrorhyncha*, appears to be an undescribed species (J. Williams pers. comm.). *Boronia rupprii* is uncommon at Woodsreef, the type locality, and appears to be different to populations elsewhere in New South Wales (J. Williams and J. Bruhl pers. comm.). Another species growing on serpentinite that may prove to



Fig. 10. *Hakea pulvinifera* — a rare shrub, growing near Lake Keepit.

be unnamed is the *Brachyscome* occurring east of Chaffey Dam. This species has been identified as *Brachyscome rigidula* s. lat. (P. Short pers. comm.). According to Salkin et al. (1995) this species grows in alpine and sub-alpine areas in mainland Australia, areas very unlike the area east of Chaffey Dam.

The *Homopholis* sp. listed above is only known from around Woodsreef and another serpentinite area near Bingara (K. Wills pers. comm.). The *Hovea* sp. was previously only known from the Woodsreef area, however, it was also collected on serpentinite between Attunga and Halls Creek and east of Chaffey Dam during this study. The population east of Chaffey Dam appears to be the largest, while the population between Attunga and Moore Creek contains some individuals larger than any seen at other sites and this form requires further investigation. The *Callistemon* sp. common in gullies at Woodsreef has previously been confused with *Callistemon sieberi* (L. Craven pers. comm.) and was not found in any other area during this study. The *Dianella* sp., formerly confused with *Dianella revoluta* var. *vinosa*, was only found on serpentinite areas at Woodsreef and east of Chaffey Dam (G. Carr pers. comm.). *Minuria cunninghamii* in the National Herbarium of New South Wales (NSW) collection appears to contain two entities, one occurring on serpentinite at Woodsreef and east of Chaffey Dam and one from further west. The serpentinite form is clearly different from *Minuria cunninghamii* occurring in non-serpentinite areas (P. Short pers. comm.). Using current keys the *Glycine* sp. at Woodsreef and east of Chaffey Dam would key out to *Glycine clandestina* but the species from serpentinite is clearly different to the species elsewhere in the survey area. The *Glycine* found on serpentinite has longer hairs on the stems, leaves and calyces than the species occurring elsewhere in the survey area.

A recently described species, *Schoenus centralis* (Cyperaceae), has been recorded from serpentinite areas at Woodsreef growing specifically along intermittent creek beds, this species has variegated green and brown flowering heads, and is uncommon in northern New South Wales.

Further studies on serpentinite areas within this survey area appear to be warranted. None of the serpentinite species appears to be endangered by current grazing practices in the serpentinite areas mentioned above.

(iii) Plants of regional significance

Over 30 native taxa within the study area are considered to be of regional significance, most of which are new records for the North Western Slopes (see Table 2). These include disjunct populations of *Pterostylis chaetophora*, *Sida atherophora* and *Daphnandra* sp. A. Several species more common on the coast and tablelands reach their western limit within the study area including *Dendrobium cucumerinum*, *Dendrobium tarberi*, *Austrocynoglossum latifolium*, *Myriophyllum pedunculatum* subsp. *longibracteolatum*, *Melicope micrococca* and *Eucalyptus obliqua*. Western species reaching their eastern limit include *Bulbine alata* and *Cyperus pygmaeus*. The record of *Striga parviflora*, found growing amongst clumps of *Triodia scariosa* on serpentinite east of Chaffey Dam, is the first record of this root parasite from New South Wales.

Table 6. Number and proportions of native and naturalised exotic taxa in this study in relation to life form and life cycle.

	Total no. of taxa	No. of native taxa	% of native taxa	No. of exotic taxa	% of exotic taxa
Life form					
Fern (Pt)	16	16	100.0	0	0
Forb (F)	470	234	49.8	236	50.2
Grasses (G)	156	87	55.8	69	44.2
Grass-like (GL)	120	100	83.3	20	16.7
Low shrub (LS) (< 2m)	100	85	85	15	15.0
Tall shrub (TS) (> 2m)	51	34	66.6	17	33.3
Tree (T)	67	46	68.7	21	31.3
Climber or twiner (C)	38	23	60.5	15	39.5
Epiphyte (E)	7	7	100.0	0	0
Epilith (e)	7	7	100.0	0	0
Parasite (P)	16	15	93.8	1	6.2
Hemiparasite (HP)	2	2	100.0	0	0
Life cycle					
Annual (AN)	248	76	30.6	172	69.4
Short lived perennial (SP)	79	22	27.8	57	72.2
Perennial (PE)	672	519	77.2	153	22.8
Perennial rootstock and annual stems (PA)	42	30	71.4	12	28.6

(iv) Conservation reserves

The only conservation reserves existing in the survey area are found in dissected country on the eastern side, the largest being Warrabah National Park. Only one of the seven species of national and state significance (*Derwentia arenaria*) is currently in a conservation reserve within the study area. The Woodsreef site and the serpentinite area east of Chaffey Dam, in particular, warrant appropriate means of protection for their high concentration of significant species. Information presented in this study has been passed on to the NSW National Parks and Wildlife Service and they have expressed an interest in the Crown Land area around Woodsreef asbestos mine.

Life history attributes

A diversity of life forms (Table 6) is represented but overall the taxa are predominantly forbs, grasses or grass-like plants (72%) and a significant proportion are perennial (69%). The perennial taxa (perennials and plants with perennial rootstock and annual

tops) are predominantly native (77%), whereas the annuals or short-lived perennials are predominantly exotic (70%). Similar results have been documented in other studies of Australian woodland and grassy communities (Trémont 1994, McIntyre et al. 1995, Pettit et al. 1995).

Conclusion

The native vegetation of the study area has been considerably altered since European settlement. Despite the long history of disturbance a relatively high number of native taxa are recorded (647), comprising 62% of the total number of taxa recorded. This species richness may reflect the diversity of landforms, geology and climate within the region as well as the natural resilience of many of the native species. The long-term nature of this study has provided a more complete picture of overall floristic diversity than generally found in shorter surveys. The threat of invasion and replacement by introduced species is a serious problem. The only conservation reserves existing in the survey area are found in dissected country on the eastern side, the largest being Warrabah National Park which recorded the highest number of native taxa (351). The authors know of no fertile, gently-sloping areas which have not been modified by many years of grazing or cropping. In these areas the least disturbed native vegetation is found along some stock routes and roadsides. The serpentinite areas at Woodsreef and east of Chaffey Dam are of particular scientific interest with an unusual concentration of rare, restricted and/or undescribed species and warrant further investigation and appropriate means of protection. A more comprehensive reserve system is clearly needed to protect the range of vegetation communities existing in the study area.

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