The vascular flora of a part of the mallee region north of Esperance, Western Australia

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Abstract

Van der Moezel, Paul.G. The vascular flora of a part of the mallee region north of Esperance, Western Australia. Kingia 1(3):303-319(1990). A total of 344 vascular plant taxa are listed which were collected from Crown Land in a part of the mallee region north of Esperance, Western Australia. The three main families were Myrtaceae, Leguminosae and Proteaceae and the three main genera were *Acacia*, *Eucalyptus* and *Melaleuca*. Thirty-three taxa are listed as either rare, restricted or poorly known according to various authorities.

Introduction

Mallee communities in Australia occur across the southern part of the continent from Western Australia (longitude 117°E) to New South Wales (longitude 146°E) between latitudes 22°S and 37°S (Parsons 1981).

In contrast to the mallee regions of eastern Australia which have been widely surveyed since the late 1940's (Parsons 1981), the mallee regions of Western Australia have received little botanical attention. Beard (1973) produced broad scale (1:250 000) vegetation maps and descriptions of the mallee region as part of the vegetation survey of Western Australia, while Monk *et al.* (1979) and Crook and Burbidge (1982) produced descriptions of mallee vegetation on a much smaller scale. The vegetation of the Roe Botanical District which lies in the mallee region was surveyed by Burgman (1985). Newbey (1979) surveyed a large part of the coastal vegetation which includes some mallee vegetation.

The discovery of coal in the mallee region north of Esperance (Elms *et al.* 1982), led to a pre-mining survey of the vegetation and soils in one particular coal mining lease (van der Moezel 1985). This paper concerns the vascular plant collections made during that survey over the period 1982-1985.

Environment

The study area is situated north of Esperance, Western Australia (Figure 1). The area is roughly rectangular in shape, 45 km long by 10 km wide elongated in a north-south direction centred around latitude 33° 22'S and longitude 121° 50'E. The western boundary is about 10 km east of the Esperance Coolgardie Highway and is parallel to it (Figure 1). The total area is 442.6 km^2 of which 312.8 km^2 or 71.1% has been cleared for agricultural use.

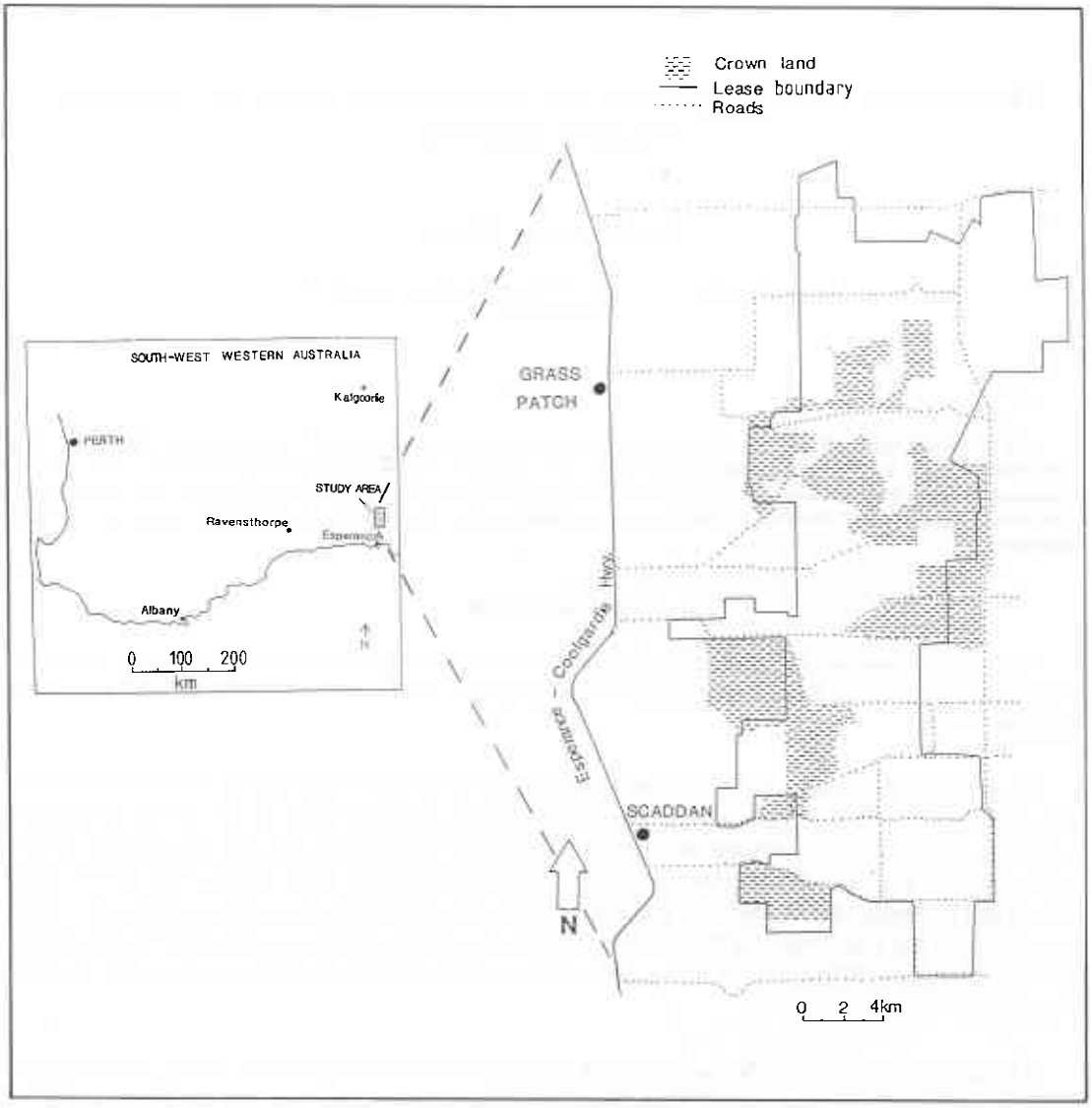

Figure 1. General location of the study area showing the coal mining lease, main tracks and extent of Crown Land

Climate

The climate of the study area can be broadly classified as Mediterranean (Köppen 1923), being influenced by an anticyclonic weather system which brings rain-bearing cold fronts in winter and causes hot, dry conditions during summer. The only two Bureau of Meteorology weather stations located near the study area are those at Scaddan and Grass Patch, both about 10 km west of the area. Average annual rainfall at Scaddan is 414 mm (Table 1) occurring mostly during May to August (48.1%) while the average annual rainfall at Grass Patch is 348 mm (May-August = 46.0%).

Table 1. Rainfall data for Scaddan and Grass Patch

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
SCADDAN													
Mean Rainfall (mm)	17	20	24	32	48	52	50	49	41	36	26	19	414
Mean No. of rain days	3	3	4	6	9	10	11	10	8	7	5	3	71
GRASS PATCH													
Mean Rainfall (mm)	16	21	23	24	38	44	38	40	33	31	22	18	348
Mean No. of rain days	2	3	4	5	7	9	10	10	7	6	4	3	370

Physiographic features

Much of the area contains sets of longitudinal dunes which are usually associated with interdunal salt lakes. The vegetated dunes are mostly aligned on a west-east direction but some dunes are aligned along a west-north-west/east-south-east direction.

An extraordinarily large number of salt lakes and salt pans extend throughout the study area. The lakes vary from small circular lakes of less than one hectare in area to long thin lakes associated with the swales of the longitudinal dunes and also to large irregular shaped lakes. The lakes are usually dry during summer but contain a thin covering of water during winter. On the eastern side of most lakes are small crescent shaped dunes called lunettes.

Soils

The soils of the study area are described as being chiefly alkaline with a bleached A2 horizon and pedal subsoils (Dy 5.43) (Northcote *et al.* 1967). Other associated soils are grey-brown highly calcareous earths, leached sands, lunette soils and cracking grey clays. There are no rocky outcrops in the study area.

Vegetation

The study area is located in the South-West Botanical Province of Western Australia (Beard 1980). Within this Province, the area lies in the south-eastern section of the Roe Botanical District which is predominantly mallee vegetation. The southern part of the study area has vegetation which is characteristic of both the Roe Botanical District and the Eyre Botanical District which is located to the immediate south.

The types of vegetation formations present are extremely varied, ranging from Woodland to Mallee, Shrubland and Salt Complex formations (van der Moezel 1985). The main overstorey species in Woodland and Woodland/Mallee communities are *Eucalyptus eremophila, E. leptocalyx, E. goniantha, E. uncinata* and *E. conglobata.* Mallee formations are dominated by *E. tragona* and *E. angulosa* which emerge over a dense sclerophyllous shrub stratum. Shrubland formations contain *Melaleuca* species particularly *M. halmaturorum* ssp. *cymbifolia* and *M. nesophila.* Salt Complex vegetation consists of halophytic species such as *Halosarcia syncarpa, Stipa eremophila* and *Atriplex vesicaria.*

Results

Floristics

The total flora recorded for the study area consisted of 344 taxa from 158 genera and 57 families (Appendix 1). Thirty (8.7%) taxa were not identified to species level. Of these 30 taxa, 4 are new undescribed species, 14 have affinities with known species while the remaining 12 were either unidentifiable or had no known close affinities. The genera *Acacia* and *Melaleuca* had the most number of unidentified taxa with 8 and 5 respectively. Only 9 species (2.6%) were recorded as introduced (species along roadsides and in cleared land were not sampled). Low colonisation by introduced species into Western Australian mallee communities has also been recorded by Newbey (1979) and Burgman (1985) with values of 1.4% and 2.6% respectively.

The five main families represented were Myrtaceae (71 taxa), Leguminosae (46 taxa), Proteaceae (33 taxa), Asteraceae (27 taxa) and Epacridaceae (19 taxa). The largest genera were *Melaleuca* (27 taxa), *Acacia* (25 taxa) and *Eucalyptus* (20 taxa) (Table 2). The three families Myrtaceae, Leguminosae and Proteaceae and the three genera *Acacia*, *Eucalyptus* and *Melaleuca* occur in the top three or four places of all species lists taken from mallee regions of Western Australia (Newbey 1979, Monk *et al.* 1979, Burgman 1985, this survey - Appendix 1).

Table 2. Major families and genera from the study area.

Family	No. of taxa	% of total taxa
Myrtaceae	71	20.7
Leguminosae	46	13.4
- Mimosoideae	25	7.3
- Papilionoideae	20	5.8
- Caesalpinoideae	1	0.3
Proteaceae	33	9.6
Asteraceae	27	7.8
Epacridaceae	19	5.5
Orchidaceae	12	3.5
Chenopodiaceae	11	3.2
Rutaceae	11	3.2
Poaceae	8	2.3
Others	106	31.2
Total	344	

Genus	No. of taxa	% of total taxa
Melaleuca	27	7.8
Acacia	25	7.3
Eucalyptus	20	5.8
Hakea	12	3.5
Leucopogon	10	2.9
Pultenaea	6	1.7

Conservation status

The species list contains 33 taxa (9.8%) which have been listed by either Leigh *et al.* (1981), Marchant and Keighery (1979), Rye and Hopper (1981), Patrick and Hopper (1982), Rye (1982) or Burgman (1985) as rare, restricted or poorly known (Table 3). This figure is likely to be higher since undescribed or recently described species are not included. A new species of the genus *Conostephium* (Epacridaceae) was described as a result of collections made during this research (van der Moezel 1987).

Table 3. Rare, restricted or poorly known taxa of the study area

Key to abbreviations and codes.

Conservation value:

LBH (Leigh, Briggs and Hartley 1981)

1. Species known only from type collection or from a single collection.
2. Very restricted distribution in Australia and only with geographical range less than 100 km.
3. Species with a range over 100 km but occurring only in small populations.
X. Species presumed extinct.
E. Endangered species in serious risk of disappearing from the wild state within one or two decades if present land use and other causal factors continue to operate.
V. Vulnerable species not presently endangered but at risk over a longer period.
R. Species which are rare in Australia but which are not currently considered endangered or vulnerable.
K. Poorly known species that are suspected to belong to one of the above categories.
C. Known to be represented within a National Park or other proclaimed reserve.

MK (Marchant and Keighery 1979)

A. Species not having any Western Australian collected material.
B. Apparently rare and geographically restricted.
C. Species known only from the type collection.
D. Poorly known species, with less than 5 herbarium collections.
E. Species with restricted distribution of less than 100 km.
F. Species with distribution of less than 160 km.

The number refers to the number of specimens at PERTH in 1979.

RHP (Rye and Hopper 1981, Rye 1982, Patrick and Hopper 1982)

X. Known from only one locality.
VR. Very rare. Less than one thousand reproductively mature plants in the wild.
R. Rare. Less than a few thousand reproductively mature plants in the wild.
A. Abundant. More than a few thousand reproductively mature plants in the wild.
G. Gazetted as rare.
C. Occurring on a conservation reserve.
P. Known to have been propagated.

The number refers to approximate geographical range in km.

MB (Burgman 1985)

Codes used are the same as Leigh *et al.* (1981)

Table 3 (continued). Rare, restricted or poorly known taxa of the study area

Taxa	Conservation value			
	LBH	MK	RHP	MB
Colchicaceae				
Wurmbea sinora				3K
Juncaginaceae				
Triglochin muelleri	3K	-A		3K
Apiaceae				
Hydrocotyle rugulosa		3D		
Epacridaceae				
Andersonia macranthera	3K			3VC
Conostephium drummondii		4D		3RC
Conostephium uncinatum				2V
Lamiaceae				
Prostanthera microphylla ssp. *serpyllifolia*		2D		
Lauraceae				
Cassytha melantha		4D		
Leguminosae				
Mimosoideae				
Acacia crassuloides	2V			3V
Acacia glaucoptera	3RC	20F		
Acacia pachypoda		6F		
Acacia pritzeliana	3RC	14F		3RC
Acacia sorophylla		3D		3VC
Papilionoideae				
Bossiaea leptacantha		3D		
Oxylobium microphyllum		11F	145	
Pultenaea aduncа		10F		
Myoporaceae				
Eremophila dichroantha		10B		
Myrtaceae				
Baeckea blacketii	2K			
Darwinia polycephala			X--	
Eucalyptus sp. aff. *angustissima*				3E
Eucalyptus forrestiana ssp. *forrestiana*	2VC			3RC
Eucalyptus gardneri	3RC			
Eucalyptus halophila				3VC
Eucalyptus merrickiae	3R			2V
Eucalyptus occidentalis	2RC			
Melaleuca cliffortioides	3RC	7F		3RC
Melaleuca nesophila		9E		
Proteaceae				
Adenanthos ileticos	2E		25RG	2E
Banksia blechnifolia	3VC			3RC
Dryandra ferruginea		20F		
Hakea brooksiana		6F	130CP	
Isopogon alcicornis		6B	160C	
Rhamnaceae				
Cryptandra polyclada	2RC	3D		

Physiognomy

Each of the 344 taxa was classified according to the life form categories of Newbey (1979) (Table 4). The system used by Newbey subdivides the primary life forms of Raunkiaer (1937) to allow for the vegetation classification of Muir (1977) and the life forms of the South-West Botanical Province. The dominant life forms were dwarf shrubs (30.5%), small shrubs (19.2%), annuals (10.2%) and medium shrubs (9.0%). These same four life forms in very similar proportions dominated the species list of Newbey (1979). Burgman (1985) however recorded almost 45% dwarf shrubs from the Roe Botanical District. This high dwarf shrub value was the result of sampling many heath communities. Heath vegetation was not prominent in this study area. In comparison to some New South Wales mallee communities (Wood 1929; Whittaker *et al.* 1979) the percentage of nanophanerophytes in the Western Australian mallee is much higher while the percentage of hemicryptophytes and therophytes is lower.

Table 4. Life form categories of taxa in the study area.

Life form		Taxa	%	Total %
MESOPHANEROPHYTES	Small trees 5-15 m	6	1.7	
	Medium trees 15-30 m	-	-	1.7
	Large trees > 30 m	-	-	
MICROPHANEROPHYTES	Dwarf trees < 5 m	2	0.6	
	Tall shrubs > 2 m	22	6.4	11.0
	Mallees - Tree form	8	2.3	
	- Shrub form	6	1.7	
NANOPHANEROPHYTES	Dwarf shrubs < 0.5 m	105	30.5	
	Small shrubs 0.5-1.0 m	66	19.2	
	Medium shrubs 1.0-1.5 m	31	9.0	63.4
	Large shrubs 1.5-2.0 m	12	3.5	
	Herbaceous shrubs	-	-	
	Climbers	4	1.2	
CHAMAEPHYTES	Mat plants	5	1.5	1.5
HEMICRYPTOPHYTES	Rosette perennials	3	0.9	
	Perennial grasses	8	2.3	
	Colonial sedges	-	-	6.4
	Tufted sedges	8	2.3	
	Sedge-like	3	0.9	
GEOPHYTES	Terrestrial geophytes	19	5.5	5.5
	Hydrophytes	-	-	
THEROPHYTES	Annual grasses	-	-	10.2
	Other annuals	35	10.2	
PARASITIC CLIMBERS	Parasitic climbers	1	0.3	0.3

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(*Acacia*), P.G. Wilson (Chenopodiaceae and Rutaceae), M.I. Brooker (*Eucalyptus*), T. Macfarlane (Monocots) M. Trudgen (*Baeckea*), B. Barlow (*Melaleuca*), J. Powell (Epacridaceae), L. Craven (*Calytrix*), R. Peakall, (Orchidaceae), K. Newbey, M. Burgman and E. Bennett (various).

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Appendix 1. Species list

The first three columns for each taxa gives the life form category. Abbreviations, according to Newbey (1979) and Burgman (1985) are as follows:

ST	=	Small Tree
DT	=	Dwarf Tree
MAT	=	Mallee - tree form
MAS	=	Mallee - shrub form
TS	=	Tall Shrub
LS	=	Large Shrub
MS	=	Medium Shrub
SS	=	Small Shrub
DS	=	Dwarf Shrub
CL	=	Climber
MP	=	Mat Plant
RP	=	Rosette Perennial
PG	=	Perennial Grass
SI	=	Tufted Sedge
SL	=	Sedge-like
AB	=	Terrestrial Geophyte
AS	=	Other Annuals
PC	=	Parasitic Climber

Numbers after the life form abbreviations refer to the collection numbers (PGV numbers). Specimens are lodged at the Western Australian Herbarium (PERTH). Known monthly flowering times have been noted where possible. Nomenclature follows Green (1985) except for Leguminosae, which is given family status. Introduced species are denoted by an asterisk.

PTERIDOPHYTA

Adiantaceae

DS	53		*Cheilanthes austrotenuifolia* H. Quirk & T.C. Chambers

GYMNOSPERMAE

Cupressaceae

TS	73		*Callitris preissii* Miq. ssp. *verrucosa* (Cunn. ex Vogel) J. Garden
TS	170		*Callitris roei* (Endl.) F. Muell.

ANGIOSPERMAE MONOCOTYLEDONAE

Anthericaceae

AB	195	OCT	*Arthropodium capillipes* Endl.
DS	289	SEP	*Laxmannia brachyphylla* F. Muell. ex Benth.
CL		SEP-OCT	*Thysanotus patersonii* R.Br.
AB	256	DEC-JAN	*Thysanotus tenellus* Endl.

Asphodelaceae

AB	408	SEP	*Bulbine semibarbata* (R.Br.) Haw.

Centrolepidaceae

AS	481	SEP	*Centrolepis cephaloformis* Reader ssp. *cephaloformis*

Colchicaceae

AB	473	SEP	*Wurmbea sinora* T.D. Macfarlane

Dasypogonaceae

SL	80		*Lomandra collina* (R.Br.) Ewart

Cyperaceae

SI	238		*Caustis dioica* R.Br.

Appendix 1 (continued). Species list

SI	328		*Chorizandra enodis* Nees
SI	46	MAR	*Lepidosperma pruinosum* Keuk. var. *rigidulum* Keuk.
SI	26		*Lepidosperma drummondii* Benth.
SI	279		*Schoenus asperocarpus* F. Muell.
Hypoxidaceae			
AB	434	SEP	*Hypoxis occidentalis* Benth.
Iridaceae			
SL			*Patersonia* sp. indet.
Juncaginaceae			
AS	476	SEP	*Triglochin muelleri* Buchenau
Orchidaceae			
AB	415	SEP	*Caladenia dilatata* R.Br. var. *falcata* (Nicholls) Clements & Hopper
AB	285	AUG-SEP	*Caladenia doutchae* O. Sarg.
AB	416	SEP	*Caladenia* sp. aff. *integra* E. Coleman
AB	284	SEP	*Caladenia longicauda* Lindley
AB	414	SEP	*Caladenia roei* Benth.
AB	100	AUG-SEP	*Caladenia saccharata* H.G. Reichb.
AB	412	SEP	*Microtis unifolia* (G. Forster) H.G. Reichb.
AB	105	AUG-SEP	*Pterostylis mutica* R.Br.
AB	184	AUG-SEP	*Pterostylis nana* R.Br.
AB	306	SEP	*Pterostylis sargentii* C. Andrews
AB	99	AUG	*Pterostylis vittata* Lindley
AB	204	SEP-OCT	*Thelymitra nuda* R.Br.
Phormiaceae			
SL	98		*Dianella revoluta* R.Br.
Poaceae			
PG	236	DEC	*Amphipogon strictus* R.Br.
PG	474	SEP	* *Catapodium rigidum* (L.) C.E. Hubb.
PG	407	SEP	* *Pentaschistis airoides* (Nees) Stapf
PG	435	SEP	*Poa drummondiana* Nees
PG	126	AUG-SEP	*Stipa eremophila* Reader
PG	428	SEP	*Stipa hemipogon* Benth.
PG	438	SEP	* *Vulpia bromoides* (L.) Gray
PG	406	SEP	* *Vulpia myuros* (L.) C. Gmelin
Restionaceae			
SI	137		*Leptocarpus humilis* Gilg
SI	283		*Loxocarya fasciculata* (R.Br.) Benth.
SI	79		*Restio sphacelatus* R.Br.
			ANGIOSPERMAE DICOTYLEDONAE
Aizoaceae			
MP	51	SEP	* *Carpobrotus edulis* (L.) L. Bolus
MP		SEP	*Disphyma crassifolium* (L.) L. Bolus
MP	272		* *Tetragonia decumbens* Miller
MP	275		*Tetragonia implexicoma* (Miq.) J.D. Hook.
Apiaceae			
AS	404	SEP	*Hydrocotyle rugulosa* Turcz.
DS	248		*Platysace effusa* (Turcz.) Norman
DS	365		*Platysace juncea* (Bunge) Norman
AS	199	SEP	*Trachymene cyanopetala* (F. Muell.) Benth.
AS	480	SEP	*Trachymene* sp. indet.

Appendix 1 (continued). Species list

Apocynaceae			
LS	67	JAN, MAY	*Alyxia buxifolia* R.Br.
Asteraceae			
AS	442	SEP	*Asteridea athrixioides* (Sonder & F. Muell.) G. Kroner
AS	426	SEP	*Blennospora drummondii* A. Gray
AS	317	FEB	*Brachycome ciliaris* (Labill.) Less.
AS	475	SEP	*Brachycome exilis* Sonder
AS		MAR,SEP	*Brachycome perpusilla* (Steetz) J. Black var. *tenella* (Turcz.) Davis
AS	479	SEP	*Chthonocephalus pseudevax* Steetz
AS	472	SEP	*Cotula cotuloides* (Steetz) Druce
SS	225	DEC-MAR	*Helichrysum blackallii* N. Burb.
DS	460	SEP	*Helichrysum obtusifolium* F. Muell. & Sonder ex Sonder var. *obtusifolium*
DS	419	SEP	*Helichrysum obtusifolium* F. Muell. & Sonder ex Sonder var. *tephrodes* Turcz.
AS	429	SEP	*Helipterum laeve* (A. Gray) Benth.
AS	425	SEP	*Helipterum manglesii* (Lindley) Benth.
AS	411	SEP	*Helipterum pygmaeum* (DC.) Benth. var. *occidentale* Benth.
AS	432	SEP	*Hyalochlamys globifera* (A. Gray)
AS	433	SEP	*Microseris scapigera* (Sol. ex Cunn.) Schultz-Bip.
AS	410	SEP	*Millotia myosotidifolia* (Benth.) Steetz
SS	43	SEP	*Olearia muelleri* (Sonder) Benth.
SS	94	MAY	*Olearia passerinoides* (Turcz.) Benth.
SS	202	SEP	*Olearia revoluta* F. Muell. ex Benth.
AS	409	SEP	*Podolepis tepperi* (F. Muell.) D.A. Cooke
AS	443	SEP	*Podotheca angustifolia* (Labill.) Less.
AS	437	SEP	*Scyphocoronis major* (Turcz.) Druce
AS	405	SEP	*Senecio glossanthus* (Sonder) Belcher
AS	431	SEP	*Siloxerus pygmaeus* (A. Gray) P.S. Short
AS	424	SEP	* *Ursinia anthemoides* (L.) Poiret
AS	207	OCT	*Waitzia acuminata* Steetz
AS	481	SEP	Asteraceae sp. indet.
Boraginaceae			
DS	226		*Halgania andromedifolia* Behr. & F. Muell.
DS	293	SEP	*Halgania rigida* S. Moore
Brassicaceae			
AS	477	SEP	* *Hymenolobus procumbens* (L.) Nutt. ex Schinz & Thell.
AS	482	SEP	*Lepidium phlebopetalum* (F. Muell.) F. Muell.
Campanulaceae			
AS	470	SEP	*Wahlenbergia gracilenta* Loth.
Casuarinaceae			
LS			*Allocasuarina campestris* (Diels) L. Johnson
SS			*Allocasuarina humilis* (Otto & Dietr.) L. Johnson
DS	345		*Allocasuarina thuyoides* (Miq.) L. Johnson
Chenopodiaceae			
SS	252	MAR	*Atriplex vesicaria* Heward ex Benth.
DS	50		*Enchylaena tomentosa* R.Br.
DS	55		*Halosarcia halocnemoides* (Nees) Paul G. Wilson ssp. *catenulata* Paul G. Wilson
DS	20	SEP	*Halosarcia lylei* (Ewart & J. White) Paul G. Wilson
DS	49	SEP	*Halosarcia syncarpa* Paul G. Wilson
DS	124		*Halosarcia* sp. indet.
DS	21	SEP	*Halosarcia* sp. nov.
DS	48		*Maireana oppositifolia* (F. Muell.) Paul G. Wilson
SS	259		*Rhagodia baccata* (Labill.) Moq.
DS	57		*Rhagodia crassifolia* R.Br.
MP	47		*Tegicornia uniflora* Paul G. Wilson x *Halosarcia* sp.

Appendix 1 (continued). Species list

Crassulaceae			
AS	436	SEP	*Crassula colorata* (Nees) Ostenf.
Dilleniaceae			
DS	97	JUL-SEP	*Hibbertia gracilipes* Benth.
DS		MAR,SEP	*Hibbertia hypericoides* (DC.) Benth.
SS	72	MAY-SEP	*Hibbertia pungens* Benth.
Droseraceae			
AB	427	SEP	*Drosera glanduligera* Lehm.
AB	363		*Drosera macrantha* Endl.
Epacridaceae			
DS	241	JUL-SEP	*Andersonia macranthera* F. Muell.
DS	449	SEP	*Astroloma* sp. aff. *conostephioides*
DS	191		*Brachyloma concolor* (F. Muell.) C. Gardner
SS	246		*Conostephium drummondii* (Stschegl.) C. Gardner
SS	83		*Conostephium marchantiorum* Strid
SS	213		*Conostephium uncinatum* Moezel
DS	118	MAR,AUG	*Leucopogon capitellatus* DC.
DS	117	JAN-MAR	*Leucopogon crassifolius* Sonder
DS			*Leucopogon cuneifolius* Stschegl.
SS	258	DEC-MAR	*Leucopogon dielsianus* E. Pritzel
SS	174	AUG-SEP	*Leucopogon fimbriatus* Stschegl.
SS	464	SEP	*Leucopoon flavescens* Sonder var. *brevifolius* Benth.
MS	28	MAY	*Leucopogon insularis* Cunn. ex DC.
MS	40	MAR-JUL	*Leucopogon rubicundus* F. Muell. ex Benth.
DS	215	AUG	*Leucopogon* sp. indet.
DS	218	JUL	*Leucopogon* sp. indet.
SS		SEP	*Lysinema ciliatum* R.Br.
DS	290	SEP	*Monotoca tamariscina* F. Muell.
DS	323		*Styphelia hainesii* F. Muell.
Euphorbiaceae			
DS	336		*Bertya dimerostigma* F. Muell.
SS	70		*Beyeria lechenaultii* (DC.) Baillon
SS	16	DEC	*Monotaxis luteiflora* F. Muell.
Frankeniaceae			
DS	123	JAN,AUG	*Frankenia brachyphylla* Summerh.
DS	22		*Frankenia decurrens* Summerh.
Goodeniaceae			
DS	45	JAN,AUG	*Coopernookia strophiolata* (F. Muell.) Carolin
DS			*Dampiera lavandulacea* Lindley
DS	134	AUG-SEP	*Dampiera stenophylla* Krause
RP	292	SEP	*Goodenia affinis* Vriese
RP	242	DEC	*Goodenia laevis* Benth.
DS	157	MAY-SEP	*Lechenaultia formosa* R.Br. var. *oblata* (Sweet) Pritzel
DS	240	DEC	*Scaevola restiacea* Benth.
Gyrostemonaceae			
MS	267		*Gyrostemon ramulosus* Desf.
TS	440	SEP	*Gyrostemon subnudus* (Nees) Baillon
Haloragaceae			
DS	138	JAN-MAR	*Glischrocaryon flavescens* (J. Drumm. ex Hook.) Orch.
Lamiaceae			
SS	265	MAR-SEP	*Microcorys glabra* (Bartling) Benth.

Appendix 1 (continued). Species list

DS	193	SEP-OCT	*Prostanthera serpyllifolia* (R.Br.) Briq. ssp. *microphylla* (R.Br.) Conn
DS	106	AUG-SEP	*Westringia dampieri* R.Br. var. *brachyphylla* Ostenf.
Lauraceae			
PC	196		*Cassytha melantha* R.Br.
Leguminosae			
Subfamily Caesalpinoideae			
SS	208	SEP	*Cassia nemophila* Cunn. ex Vogel var. *nemophila*
Subfamily Mimosoideae			
DS	297		*Acacia bidentata* Benth.
DS	296		*Acacia brachyclada* W. Fitzg.
DS	92	MAY-SEP	*Acacia chrysocephala* Maslin
DS	250		*Acacia crassuloides* Maslin
MS	260	DEC-JAN	*Acacia cyclops* Cunn. ex Don
DS	302		*Acacia densiflora* group
MS	180	AUG-SEP	*Acacia dermatophylla* Benth.
DS	150		*Acacia dermatophylla* Benth. var. *crassifolia*
DS	295	SEP	*Acacia ericifolia* Benth.
TS	66	MAY-SEP	*Acacia fragilis* Maiden & Blakely
DS	487	SEP	*Acacia glaucoptera* Benth.
DS	90	MAY-SEP	*Acacia gonophylla* Benth.
SS	463		*Acacia latipes* Benth.
MS	340	SEP	*Acacia ligulata* Cunn. ex Benth.
DS	326		*Acacia* sp. aff. *maxwellii* Maiden & Blakely
SS	147	AUG-SEP	*Acacia* sp. aff. *multilineata* W. Fitzg.
MS	12	MAY-SEP	*Acacia* sp. aff. *murrayana* F. Muell. ex Benth.
DS	301		*Acacia pachypoda* Maslin
DS	318	JUL	*Acacia pritzeliana* C. Gardner
DS	305		*Acacia* sp. aff. *saxatilis* S. Moore (P81)
DS	32	DEC	*Acacia sorophylla* E. Pritzel
SS	173	JUL-AUG	*Acacia* sp. aff. *sphacelata* E. Pritzel (P46)
DS	307		*Acacia* sp. aff. P81
DS	85		*Acacia* sp. indet.
DS	107	JUL-AUG	*Acacia* sp. indet.
Subfamily Papilionoideae			
SS	187	AUG	*Aotus* sp. aff. *procumbens* Meissner
DS	211	SEP	*Bossiaea concinna* Benth.
DS	252		*Bossiaea leptacantha* E. Pritzel
SS	164	AUG	*Chorizema aciculare* (DC.) C. Gardner
DS			*Daviesia anceps* Turcz.
SS	35	SEP	*Daviesia benthamii* Meissner
SS	86	DEC	*Daviesia lancifolia* Turcz.
DS	346	JUL-SEP	*Daviesia teretifolia* R.Br. ex Benth.
DS	206	OCT	*Eutaxia* sp. indet.
DS	348		*Gastrolobium reticulatum* (Meissner) Benth.
DS	490	SEP	*Gomphoobium viscidulum* Meissner
SS	221	SEP-OCT	*Oxylobium microphyllum* Benth.
DS	334	SEP	*Oxylobium parviflorum* Benth.
SS	139	AUG-SEP	*Pultenaea aduncа* Turcz.
SS	304	SEP	*Pultenaea* sp. aff. *aduncа* Turcz.
SS	253	DEC	*Pultenaea elasticha* (F. Muell.) M.D. Crisp
DS	461	SEP	*Pultenaea neurocalyx* Turcz.
DS	151		*Pultenaea verruculosa* Turcz.
DS	263	DEC	*Pultenaea* sp. indet.
DS	264	JUL	*Templetonia sulcata* (Meissner) Benth.

Appendix 1 (continued). Species list

Lobeliaceae			
AS	189	OCT	*Isotoma scapigera* (R.Br.) Don
AS	224	DEC	*Lobelia heterophylla* Labill.
Loganiaceae			
DS	298	SEP	*Logania stenophylla* F. Muell.
Malvaceae			
SS		OCT	*Alyogyne hakeifolia* (Giord.) Alef.
Myoporaceae			
MS	219	OCT	*Eremophila decipiens* Ostenf.
MS	299	SEP	*Eremophila dichroantha* Diels
TS	276	SEP	*Eremophila pachyphylla* Diels
SS	54	MAY	*Myoporum deserti* Cunn. ex Benth.
Myrtaceae			
MS		AUG-SEP	*Astartea ambigua* F. Muell.
MS	186	MAY-SEP	*Baeckea blacketii* F. Muell.
DS	116	AUG-SEP	*Baeckea* sp. aff. *crassifolia* Lindley
LS	188	SEP-OCT	*Baeckea uncinella* Benth.
MS	85	JUL-AUG	*Beaufortia micrantha* Schauer
DS	166	NOV	*Beaufortia schaueri* Preiss ex Schauer
SS	230	JUL,DEC	*Calothamnus gibbosus* Benth.
SS	77	MAR-SEP	*Calothamnus gracilis* R.Br.
SS	271		*Calothamnus quadrifidus* R.Br.
DS	282	SEP	*Calytrix leschenaultii* (Schauer) Benth.
DS	423	SEP	*Calytrix tetragona* Labill.
SS	69	MAR-SEP	*Chamelaucium ciliatum* Desf.
SS	462	SEP	*Chamelaucium megalopetalum* F. Muell. ex Benth.
DS	212	SEP-OCT	*Darwinia diosmoides* (DC.) Benth.
DS	63	MAY-SEP	*Darwinia polycephala* C. Gardner
MAT	81	SEP	*Eucalyptus angulosa* Schauer
MAS	91	DEC-JAN	*Eucalyptus* sp. aff. *angustissima* F. Muell.
ST	58		*Eucalypus conglobata* (R.Br. ex Benth.) Maiden
ST	64	DEC-JAN	*Eucalyptus eremophila* (Diels) Maiden
S	183	DEC-JAN	*Eucalyptus flocktoniae* (Maiden) Maiden
ST			*Eucalyptus forrestiana* Diels ssp. *forrestiana*
ST	384	JUL	*Eucalyptus gardneri* Maiden
ST	29	SEP-OCT	*Eucalyptus goniantha* Turcz. ssp. *goniantha*
MAT	375		*Eucalyptus goniantha* Turcz. ssp. *semiglobosa* Brooker
MAS	197	SEP-OCT	*Eucalyptus gracilis* F. Muell. var. *gracilis*
MAS	133	MAR	*Eucalyptus halophila* D.J. Carr & S.G.M. Carr
MAT	9		*Eucalyptus leptocalyx* Blakely
MAT	41		*Eucalyptus merrickiae* Maiden & Blakely
MAS	342		*Eucalyptus micranthera* F. Muell. ex Benth.
MAT	76		*Eucalyptus occidentalis* Endl. var. *occidentalis*
MAT	383		*Eucalyptus platypus* Hook.
MAT	163	DEC	*Eucalyptus redunca* Schauer
MAS	8	AUG	*Eucalyptus rigens* Brooker
MAS	84		*Eucalyptus tetragona* (R.Br.) F. Muell.
MAT	6	JAN-MAR	*Eucalyptus uncinata* Turcz.
MS	450	SEP	*Leptospermum erubescens* Schauer
MS	337		*Leptospermum roei* Benth.
DS	300		*Leptospermum spinescens* Endl.
TS	121	SEP	*Melaleuca acuminata* F. Muell.
SS	294		*Melaleuca adnata* Turcz.
TS	420		*Melaleuca bracteosa* Turcz.
SS	155	AUG-SEP	*Melaleuca calycina* R.Br.
LS	149	SEP	*Melaleuca calycina* ssp. *dempta* Barlow
TS	4	JAN-FEB	*Melaleuca cardiophylla* F. Muell.

Appendix 1 (continued). Species list

TS	120	AUG-SEP	*Melaleuca* sp. aff. *cardiophylla* F. Muell.
TS		DEC-JAN	*Melaleuca cliffortioides* Diels
LS	31	SEP	*Melaleuca* sp. aff. *conferta* Benth.
TS	68	DEC	*Melaleuca cuneata* Turcz.
TS	453		*Melaleuca cuticularis* Labill.
SS	495		*Melaleuca elliptica* Labill.
MS	3		*Melaleuca glaberrima* F. Muell.
MS	269		*Melaleuca globifera* R.Br.
TS	23	AUG-SEP	*Melaleuca halmaturorum* ssp. *cymbifolia* (Benth.) Barlow
MS	17		*Melaleuca nesophila* F. Muell.
MS	254		*Melaleuca* sp. aff. *pauperiflora* F. Muell.
DS	2	OCT	*Melaleuca pulchella* R.Br.
TS	309		*Melaleuca pungens* Schauer
MS	486		*Melaleuca quadrifaria* F. Muell.
TS	27	SEP-OCT	*Melaleuca* sp. aff. *quadrifaria* F. Muell.
SS	3	AUG	*Melaleuca scabra* R.Br.
MS	255	NOV	*Melaleuca striata* Labill.
TS	96	DEC-JAN	*Melaleuca subtrigona* Schauer
DS	181	SEP	*Melaleuca thymoides* Labill.
TS	19	OCT	*Melaleuca thyoides* Turcz.
LS	175	OCT	*Melaleuca uncinata* R.Br.
TS	308		*Melaleuca* sp. aff. *undulata* Benth.
SS	11	JAN-MAY	*Micromyrtus elobata* (F. Muell.) Benth.
MS	177	AUG-SEP	*Phymatocarpus maxwellii* F. Muell.
DS	272		*Verticordia brownii* (Desf.) DC.
SS	109	AUG	*Verticordia densiflora* Lindley
MS	82	MAY	*Verticordia plumosa* (Desf.) Druce
Olacaceae			
SS	158	AUG-SEP	*Olax benthamiana* Miq.
Pittosporaceae			
CL	93	MAY	*Billardiera coriacea* Benth.
CL	201	OCT	*Billardiera lehmanniana* F. Muell.
SS	192	OCT	*Cheiranthera filifolia* Turcz. var. *filifolia*
Plantaginaceae			
AS	448		*Plantago debilis* R.Br.
Polygalaceae			
CL	446		*Comesperma integerrimum* Endl.
DS	205	OCT	*Comesperma spinosum* F. Muell.
Portulacaceae			
AS	478		*Calandrinia calyptrata* J.D. Hook.
Proteaceae			
DS	231	DEC	*Adenanthos cuneatus* Labill.
MS	249	SEP	*Adenanthos ileticos* E.C. Nelson
DS	87		*Banksia blechnifolia* F. Muell.
TS	37	MAR	*Banksia media* R.Br.
SS	232	DEC	*Banksia nutans* R.Br. var. *nutans*
DS	228		*Banksia petiolaris* F. Muell.
SS	378	JUL	*Banksia pulchella* R.Br.
SS	233	JUL	*Dryandra cuneata* R.Br.
DS	229		*Dryandra ferruginea* Kipp. ex Meissner
DS	156		*Dryandra tenuifolia* R.Br.
DS	488	SEP	*Grevillea nudiflora* Meissner
MS	13	MAY-SEP	*Grevillea pauciflora* R.Br. var. *stenophylla* C. Gardner
LS	34	JAN-SEP	*Grevillea plurijuga* F. Muell.
SS	145		*Grevillea* sp. indet.

Appendix 1 (continued). Species list

SS		SEP	*Hakea brooksiana* F. Muell.
LS	5	JUL-SEP	*Hakea cinerea* R.Br.
SS	220		*Hakea commutata* F. Muell.
DT		JUL	*Hakea laurina* R.Br.
MS	370	JUL	*Hakea lissocarpha* R.Br.
MS	493		*Hakea meisneriana* Kipp. ex Meissner
TS	247		*Hakea multilineata* Meissner
TS	135	AUG-SEP	*Hakea nitida* R.Br.
DS	457		*Hakea oldfieldii* Benth.
LS	227		*Hakea pandanicarpa* R.Br.
TS	1	AUG-SEP	*Hakea platysperma* Hook.
MS	62		*Hakea preissii* Meissner
DS	152		*Isopogon alcicornis* Diels
SS	148	AUG	*Isopogon buxifolius* R.Br.
SS	168		*Isopogon formosus* R.Br.
MS	71		*Persoonia hakeiformis* Meissner
SS	492		*Petrophile fastigiata* R.Br.
SS	169	SEP	*Petrophile squamata* R.Br.
MS	78	DEC	*Petrophile teretifolia* R.Br.
Rhamnaceae			
DS	119	JAN-SEP	*Cryptandra polyclada* Diels
DS	161		*Cryptandra spyridioides* F. Muell.
DS	144	AUG	*Spyridium cordatum* (Turcz.) Benth.
Rubiaceae			
DS	459		*Opercularia vaginata* Labill.
Rutaceae			
SS	101	AUG	*Boronia baeckeacea* F. Muell.
DS	341		*Boronia crassifolia* Bartling
DS	445	SEP	*Boronia crenulata* Smith var. *crenulata*
DS	203	JUL-SEP	*Boronia fabianoides* (Diels) Paul G. Wilson
DS	143	JUL-SEP	*Boronia inornata* Turcz.
DS	194		*Boronia* sp. indet.
SS	172	AUG	*Eriostemon thryptomenoides* S. Moore
SS	104	MAR-AUG	*Microcybe multiflora* Turcz.
SS		SEP	*Microcybe pauciflora* Turcz.
SS	75	MAY-SEP	*Nematolepis phebalioides* Turcz.
MS	14	AUG-SEP	*Phebalium lepidotum* (Turcz.) Paul G. Wilson var. *lepidotum*
Santalaceae			
DS	338	MAR	*Choretrum glomeratum* R.Br.
LS	33	AUG-SEP	*Exocarpos aphyllus* R.Br.
LS	153		*Exocarpos sparteus* R.Br.
SS	494	SEP	*Leptomeria pauciflora* R.Br.
SS	468		*Leptomeria preissiana* (Miq.) A.DC.
DT	65		*Santalum acuminatum* (R.Br.) A.DC.
Sapindaceae			
MS			*Dodonaea amblyophylla* Diels
DS	251		*Dodonaea bursariifolia* F. Muell.
DS			*Dodonaea caespitosa* Diels
SS	74		*Dodonaea stenozyga* F. Muell.
Solanaceae			
DS			* *Solanum nigrum* L.
Stackhousiaceae			
DS	278	SEP	*Stackhousia pubescens* A. Rich.

Appendix 1 (continued). Species list

Sterculiaceae			
DS	266	SEP	*Lasiopetalum indutum* Steudel
Stylidiaceae			
AS	447	SEP	*Levenhookia pusilla* R.Br.
RP	306		*Stylidium assimile* R.Br.
DS	268		*Stylidium repens* R.Br.
Thymelaeaceae			
SS			*Pimelea angustifolia* R.Br.
SS			*Pimelea brevifolia* R.Br.
SS	367	JUL	*Pimelea pelinos* Rye
LS	110	AUG-SEP	*Pimelea suaveolens* (Endl.) Meissner