

THE FLORA OF A REMNANT OF NATIVE VEGETATION ON
THE EASTERN SWAN COASTAL PLAIN.

CONFIDENTIAL

SUBM
170

By M.H. ROBINSON and P.R. MAWSON. Agriculture Protection Board of Western Australia, Bougainvillea Avenue, Forrestfield 6058.

INTRODUCTION

The increased requirement for land, to meet demands for housing and industrial development, in the immediate vicinity of Perth has led to the clearing of much of the native vegetation on the Swan Coastal Plain. Despite increasing public awareness of the need to conserve representative areas of natural bushland, in many suburbs that option no longer exists. Areas of natural bushland may however still be present but are privately owned or are vested in local, state or federal government bodies. In many cases, the conservation of the flora and fauna over significant portions of these holdings will not conflict with the landholders' operations. Providing the landholders' rights are respected, such areas can become valuable islands in the urban sprawl. Of particular importance is the fact that the isolation of such remnants from the general public affords them a level of protection that is virtually impossible to provide on public lands.

This paper describes the flora of a remnant patch of vegetation located on the Swan Coastal Plain at Forrestfield (15 km east of Perth), adjacent to the Darling Scarp.

SITE DESCRIPTION

The remnant vegetation described in this paper occurs on land owned by the State Government and managed by the Agriculture Protection Board of Western Australia (APB). The APB complex at Forrestfield covers an area totalling 13.8 ha., of which approximately 8 ha. remain as natural vegetation (Figure 1).

The area is surrounded by a 2 m high security fence and the boundaries and buildings are surrounded by graded fire-breaks. There has been minimal intrusion of introduced weed species, such as African Lovegrass (*Eragrostis curvula*) and Veldtgrass (*Ehrharta calycina*), into the areas of native vegetation.

The APB has managed the site since 1971, and during that time there have been no fires in any sections of the complex. However a fire did burn through the area in the summer of 1969/70 (Tony Oliver pers. comm.). Burnt stumps and fire scars on many of the larger Jarrah (*Eucalyptus marginata*) trees indicate that there have been other fires in the recent past. Records held by the Department of Conservation and Land Management indicate that the area was never logged for timber on a commercial basis,

however there are clear indications that small amounts of timber have been cut at some time during the past.

The geology of the area is characterized by siliceous soils of aeolian origin overlying alluvial clays (Marchant *et al.* 1987). There are no swamps or winter wet depressions on the site.

The vegetation is mature and in most places forms a dense cover to about one metre high. Within the small area encompassed by the site there is considerable variation in the vegetation associations. Open *Banksia* woodland over low heath, open Jarrah woodland over low heath and low heath alone, are all represented. The variation in vegetation appears to be associated with underlying soil profiles, with the open *Banksia* woodland confined to the areas with deeper white sands. Several species of plant are associated with only one type of soil profile and as such are confined to only a few locations within the site.

METHODS

Plant specimens were collected opportunistically during the period August 1989 to November 1992. Where possible, all collections included flowering material. Duplicate specimens were taken at the time of collection, one being sent as a voucher specimen to the State Herbarium for confirmation of identification and the other retained at the APB's research laboratories. Unless otherwise noted, the identification of specimens was confirmed by staff at the Western Australian Herbarium.

Collections were limited to the naturally occurring flora and did not include any introduced species.

RESULTS AND DISCUSSION

The plant species known to be present at the site are listed in Appendix 1. Nomenclature follows Marchant *et al.* (1987). The exact identity of several specimens remains to be confirmed, but these have been treated as distinct taxa for the purpose of this paper.

A total of 182 flowering plant taxa were recorded within the APB complex, belonging to 106 genera and 34 families. The families Proteaceae (26 species), Papilionaceae (15), Myrtaceae (13), Orchidaceae (13) and Anthericaceae (12) are the richest in species (Table 1).

The presence of at least 182 species of plant from 34 families indicates that this floral community is rich and diverse. It is important to note that no species of the family Asteraceae were recorded during the survey. This is

almost certainly due to the fact that the area has not been burnt for more than twenty years. Similarly the number of species recorded for the families Poaceae and Orchidaceae might well be better represented after a fire.

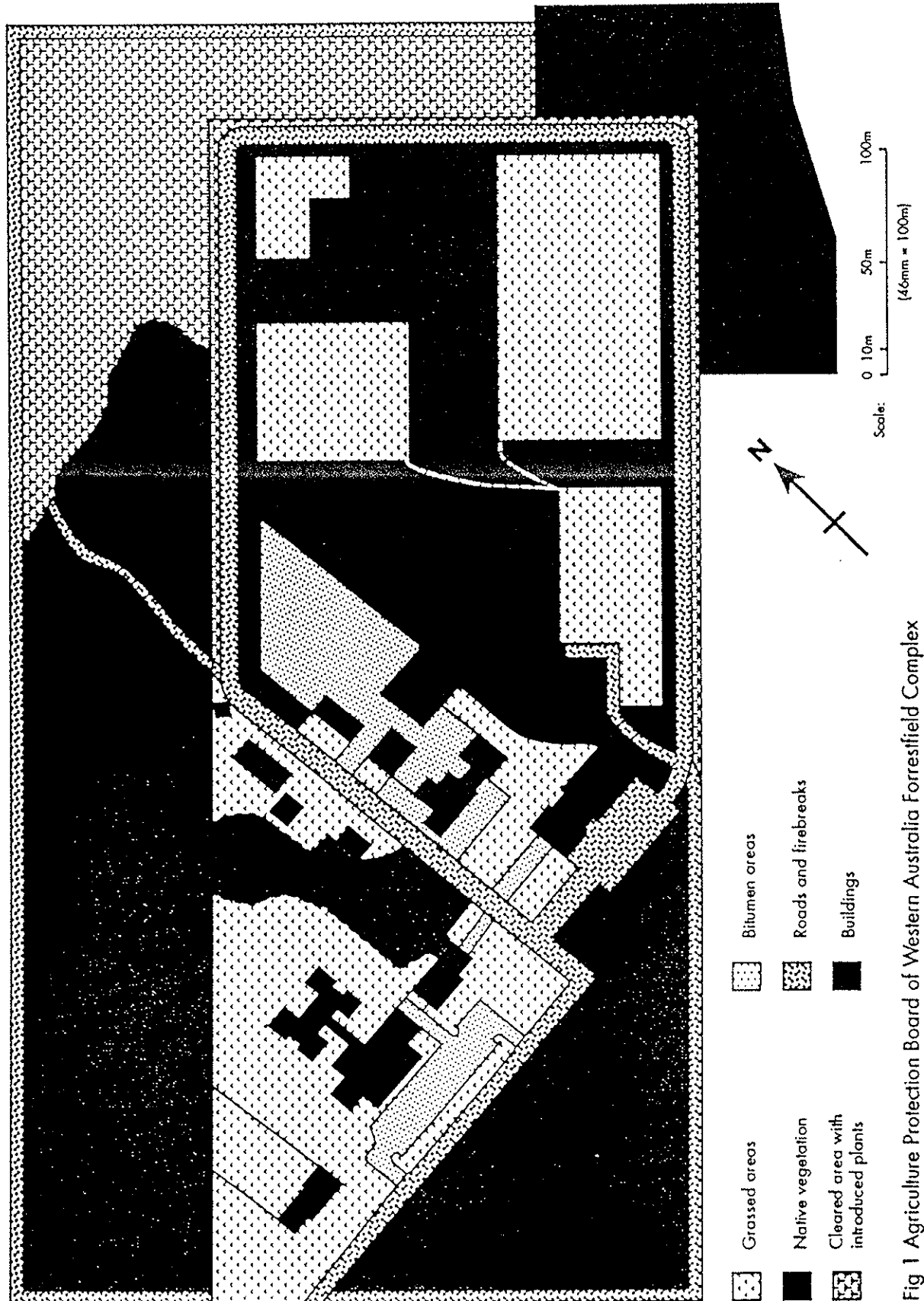


Fig 1 Agriculture Protection Board of Western Australia Forrestfield Complex

Table 1. The number of taxa recorded at Forrestfield for each family. Family sequence follows Marchant *et al.* (1987).

| Family | No. Taxa | Family | No. Taxa |
|----------------|----------|------------------|----------|
| Lauraceae | 3 | Polygalaceae | 2 |
| Casuarinaceae | 2 | Rutaceae | 2 |
| Dilleniaceae | 5 | Apiaceae | 3 |
| Droseraceae | 5 | Chloanthaceae | 1 |
| Violaceae | 1 | Lamiaceae | 2 |
| Epacridaceae | 9 | Goodeniaceae | 4 |
| Pittosporaceae | 2 | Stylidiaceae | 7 |
| Mimosaceae | 4 | Xanthorrhoeaceae | 2 |
| Caesalpinaceae | 1 | Anthericaceae | 12 |
| Papilionaceae | 15 | Dasygogonaceae | 9 |
| Proteaceae | 26 | Cholchicaceae | 1 |
| Thymeleaceae | 1 | Iridaceae | 2 |
| Myrtaceae | 13 | Orchidaceae | 13 |
| Olacaceae | 1 | Haemodoraceae | 10 |
| Loranthaceae | 2 | Cyperaceae | 9 |
| Euphorbiaceae | 2 | Restionaceae | 5 |
| Rhamnaceae | 1 | Poaceae | 5 |

As an indication of the diversity and richness of the Forrestfield site comparisons were made with the following locations. Kings Park (Bennett 1988), John Forrest National Park (Department CALM, unpublished data), Fitzgerald River National Park (Aplin and Newby 1990), Moore River to Jurien Sandplain (Griffin and Keighery 1989) and the Mount Lesueur area (Burbidge, Hopper and van Leeuwen 1990). The comparison was limited to considering which species were common to both the Forrestfield site and each of the other locations. The results of the comparison are presented in Table 2.

Table 2. Number of indigenous plant species which are recorded at Forrestfield and which are also recorded in other published floras.

| Location | Number of taxa shared with Forrestfield | | | | |
|----------------|---|------------|----------|--------------------|-------------|
| | J.F.N.P | Kings Park | F.R.N.P. | Moore R. to Jurien | Mt. Lesueur |
| No. of Species | 96 | 101 | 68 | 128 | 129 |

The flora is dominated by species normally associated with the Swan Coastal Plain but it also contains significant elements of the Darling Scarp and both the northern and southern sandplain floras.

At the species level, the number of shared taxa indicates closer affinities between Forrestfield and the two northern sandplain floras than to the other sites. This suggests that, despite the close proximity of the Forrestfield site to the Darling Scarp, the difference in soil types (exposed granite and laterite on the scarp, leached white sands over clays at Forrestfield) has a greater influence on the floristic makeup of the area than does location.

The presence of a number of species at the site is noteworthy.

One Priority Code 1 species (*Isopogon drummondii*), four Priority Code 3 species (*Conospermum undulatum*, *Dryandra* sp. #22 (aff. *pteridifolia*), *Haemodorum loratum* and *Olox scalariformis*) and one Priority Code 4 species (*Drosera occidentalis*) are present on this site (for Priority Codes see CALM 1992). Although a census has not been taken, all except *Olox scalariformis* would have local populations in excess of 100 plants.

A recently described variety of *Lambertia multiflora* (*L. multiflora* var. *darlingensis* ms) is recorded as being restricted to the lower Darling Scarp and is listed as a Code 3 species. New varieties of *Verticordia densiflora* have also recently been described, two of which are listed as Code 3 species (CALM 1992). At the time of going to press we have not been able to determine whether the *Lambertia*, the *Verticordia densiflora* or the *Verticordia* sp. (aff. *densiflora*) found at the site belong to these taxa.

Isopogon drummondii and *Conospermum undulatum*, are both species which are only found in the Forrestfield area. Unfortunately this is not an area which is blessed with an abundance of reserves vested for the protection of native flora. The importance of the APB site for the protection of these species will depend on the future development of the suburb. *Drosera occidentalis*, *Haemodorum loratum* and *Olox scalariformis* have a much wider distribution but are nonetheless vulnerable and this site provides a high level of protection for the populations here.

Dryandra sp. #22 (aff. *pteridifolia*), *Dryandra* aff. *vestita*, *Stenanthemum humile*, *Xanthorrhoea drummondii*, *Olox scalariformis*, *Stipa pycnostachya* and *Cyathochaeta clandestina* are important finds. These species are not recorded as existing in the Perth metropolitan region (Marchant et al. 1987). *Dryandra* sp. (aff. *pteridifolia*), *Stenanthemum humile*, *Xanthorrhoea drummondii* and *Cyathochaeta clandestina* are present in reasonable numbers. *Olox scalariformis* and *Stipa pycnostachya* are less abundant and *Dryandra* aff. *vestita* is limited to a single specimen on this site, with a further two specimens known from the adjacent primary school.

The record of *Eucalyptus lane-poolei* at Forrestfield (a single plant) is unusual in that this species is normally found on lateritic loam over granite, on the western side of the Darling Scarp (Brooker and Kleinig 1990). Apart from a small population at Gosnells and a doubtful record from Clackline, the species has a disjunct distribution which extends south from near Byford and north from Gingin (Napier *et al.* 1988).

The population of *Banksia incana* at Forrestfield represents the southernmost location for this species (Taylor and Hopper 1988) and the only surviving population in the metropolitan area.

Other species of plant occurring at Forrestfield represent extensions ((although small ones) to the known distributions as given in Marchant *et al.* 1987). *Caustis dioica* is known from Bullsbrook northwards, and *Hibbertia vaginata* from Canning River south to Busselton.

Seven species (*Acacia teretifolia*, *Cassyltha glabella*, *Conothamnus trinervis*, *Levenhookia dubia*, *Stylidium pubigerum*, *Thelymitra nuda* and *Xanthosia candida*) normally restricted to the Darling Scarp, are found at the site.

Danthonia caespitosa, *Haemodorum paniculatum* and *Phlebocarya filifolia* are known from only a few locations on the coastal plain. *Phlebocarya filifolia* is also a rarely collected species (Marchant *et al.* 1987).

The existence of the two species of *Dasypogon* in sympatry has seldom been recorded on the Swan Coastal Plain.

Some specimens of *Kingia australis* at Forrestfield are in excess of 4m in height, suggesting an age of approximately 275 years (Lamont and Downes 1979). The tallest specimen, at a height of over 8m was recently blown over in a storm. This specimen would have been over 500 years old. Although *K. australis* is not uncommon throughout the coastal plain, specimens of this size are now rare.

CONCLUSION

Given the species richness and number of gazetted species or unusual population records listed for this floral assemblage, there is good reason to ensure the continued security of this remnant of native vegetation. It would be reassuring to know that areas (other than those with specific vestiture as flora reserves or similar) supporting rich florals such as this could be managed in such a way as to satisfy both the landholder's requirements and the need for conservation. This site would appear to provide an outstanding example of the benefits of this type of approach. The APB has not suffered as the user and through careful management has conserved an area which is considered by many botanists to be of outstanding merit.

ACKNOWLEDGEMENTS

We would like to thank Ray Cranfield and the staff at the Western Australian Herbarium and especially Sue Patrick for all her help in confirming the identification of the specimens and kindly reading and commenting on this manuscript. Eleanor Bennett, Kingsley Dixon and Bob Dixon of the Kings Park Gardens and Sue Moore, Bronwyn Keighery and Neil Gibson from the Department of Conservation and Land Management provided valuable help and support. Our thanks also go to Margaret Pieroni and Alex George for their advice concerning the *Dryandra* species and to Greg Keighery for sorting out the problems we were having with the genera *Tricoryne* and *Xanthorrhoea*. We are also grateful to Gary Martin and Tim Lowe for their assistance in collection and curation of the material, and to Tim for assistance in entering the data on computer. Toni Lumsden kindly prepared the figure.

We also appreciate the support of the Agriculture Protection Board of Western Australia for allowing us the use of the APB's research laboratories.

REFERENCES

- APLIN, T.E.H. and NEWBY, K.R. 1990. The flora of the Fitzgerald River National Park, Western Australia. *Kingia* 1: 155-193. —
- BENNETT, E.M. 1988. *The Bushland Plants of Kings Park*. Kings Park Board.
- BROOKER, M.I.H. and KLEINIG, D. A. 1990. *Field Guide to Eucalypts. Volume 2. South-western and Southern Australia*. Inkata Press.
- BURBIDGE, A.A., HOPPER, S.D. and van LEEUWEN, S. 1990. *Nature Conservation, Landscape and Recreation values of the Lesueur area*. Bulletin 424, Environmental Protection Authority. Perth, Western Australia.
- CALM 1992. *Declared Rare and Priority Flora List*. Department of Conservation and Land Management, Perth.
- GRIFFIN, E.A. and KEIGHERY, B.J. 1989. *Moore River to Jurien Sandplain Survey*. Western Australian Wildflower Society Inc.
- LAMONT, B.B. and DOWNES, S. 1979. The longevity, flowering and fire history of the grasstrees *Xanthorrhoea preissii* and *Kingia australis*. *J. Appl. Ecol.* 16: 893-99.
- MARCHANT, N. G., WHEELER, J. R., RYE, B.L., BENNETT, E.M., LANDER, N.S. and MACFARLANE, T.D. 1987. *Flora of the Perth Region*. Western Australian Herbarium, Department of Agriculture, Western Australia.
- NAPIER, A., TAYLOR, A. and HOPPER, S. 1988. *Survey of Rare and Poorly Known Eucalypts of Western Australia. Field Guide number 5 (Forests and Metropolitan Regions)* Western Australian Department of Conservation and Land Management.
- PIERONI, M., 1990. A Dryandra Mystery Solved. In; *Dryandra Study Newsletter* January 1990. A. Cavanagh Editor.
- TAYLOR, A. and HOPPER, S. 1988. *The Banksia Atlas*. Australian Flora and Fauna Series Number 8. Bureau of Flora and Fauna, Canberra and Department of Conservation and Land Management, Western Australia.

Appendix 1. Floristic list of the Agriculture Protection Board's Forrestfield complex (species marked with the symbol ‡ have not been confirmed by the Herbarium). Nomenclature follows Marchant *et al.* (1987).

Family and species

LAURACEAE

- ‡ *Cassytha flava*
- Cassytha glabella*
- Cassytha racemosa* forma *pilosa*

CASUARINACEAE

- Allocasuarina fraseriana*
- Allocasuarina humilis*

DILLENiaceae

- Hibbertia huegelii*
- Hibbertia hypericoides*
- Hibbertia mylnei*
- Hibbertia subvaginata*
- Hibbertia vaginata*

DROSERACEAE

- ‡ *Drosera erythrorhiza*
- Drosera macrantha*
- Drosera menziesii*
- Drosera occidentalis*
- Drosera stolonifera*

VIOLACEAE

- Hybanthus calycinus*

EPACRIDACEAE

- Astroloma pallidum*
- Astroloma stomarrhena*
- Astroloma xerophyllum*
- Conostephium pendulum*
- Leucopogon conostephioides*
- Leucopogon polymorphus*
- Leucopogon sprengelioides*
- Lysinema ciliatum*
- Styphelia tenuiflora*

PITTOsporaceae

- Pronaya fraseri*
- Sollya heterophylla* Lindley

MIMOSACEAE

- Acacia pulchella* var. *glaberrima*
- Acacia stenoptera*
- Acacia teretifolia*
- Acacia willdenowiana*

CAESALPINIACEAE

- Labichea punctata*

PAPILIONACEAE

- Bossiaea eriocarpa*
- Burtonia conferta*
- Daviesia decurrens*
- Daviesia divaricata*
- Daviesia nudiflora*
- Daviesia preissii*
- Daviesia triflora*
- Gompholobium knightianum*
- Gompholobium tomentosum*
- Hovea trisperma*
- Jacksonia floribunda*
- Jacksonia lehmannii*
- Nemcia capitatum*
- Sphaerolobium* sp. (aff. *macranthum*)
- Templetonia biloba*

PROTEACEAE

- Adenanthos cygnorum*
- ‡ *Banksia attenuata*
- ‡ *Banksia grandis*
- Banksia incana*
- Banksia menziesii*
- Conospermum undulatum*
- Dryandra armata*
- Dryandra nivea*
- Dryandra sessilis*
- Dryandra* sp. (aff. *pteridifolia*)
- Dryandra* aff. *vestita*
- Hakea conchifolia*

- ‡ *Sowerbaea laxiflora*
- Thysanotus manglesianus*
- Thysanotus sparteus*
- Thysanotus triandrus*
- Tricoryne elatior*
- ‡ *Tricoryne tenella*

DASYPOGONACEAE

- Calectasia cyanea*
- Dasyogon bromeliifolius*
- Dasyogon obliquifolius*
- ‡ *Kingia australis*
- Lomandra caespitosa*
- Lomandra hermaphrodita*
- Lomandra nigricans*
- Lomandra preissii*
- Lomandra sericea*

COLCHICACEAE

- Burchardia umbellata*

IRIDACEAE

- Patersonia juncea*
- Patersonia occidentalis*

ORCHIDACEAE

- Caladenia discoidea*
- Caladenia flava*
- ‡ *Caladenia gemmata*
- Caladenia latifolia*
- Leporella fimbriata*
- ‡ *Lyperanthus nigricans*
- Microtis alba*
- ‡ *Prasophyllum* sp.
- Pterostylis recurva*
- Pterostylis vittata*
- ‡ *Pterostylis vittata* (brown form)
- Thelymitra crinita*
- Thelymitra nuda*

HAEMODORACEAE

- Anigozanthos humilis*
- Anigozanthos manglesii*
- Conostylis aculeata*
- Conostylis aurea*
- Conostylis juncea*
- Haemodorum laxum*
- ‡ *Haemodorum loratum*
- Haemodorum paniculatum*
- Haemodorum spicatum*
- ‡ *Phlebocarya filifolia*

CYPERACEAE

- Caustis dioica*
- ‡ *Cyathochaeta clandestina*
- ‡ *Lepidosperma tenue*
- Mesomelaena pseudostygia*
- Mesomelaena tetragona*
- Schoenus curvifolius*
- Schoenus latitans*
- Tetraria octandra*
- Tricostularia neesii*

RESTIONACEAE

- Alexgeorgea nitens*
- Hypolaena exsulca*
- Leptocarpus aristatus*
- Loxocarya fasciculata*
- Lyginia barbata*

POACEAE

- Danthonia caespitosa*
- Neurachne alopecuroidea*
- ‡ *Stipa "CARDUP"* (G. Keighery)
- Stipa elegantissima*
- ‡ *Stipa pycnostachya*