

The botany of old cemeteries

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Abstract

McBarron¹, E. J., Benson², D. H., and Doherty³, M. D. (¹125 Dumaresq Street, Campbelltown, Australia 2560; ²National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000; ³National Parks and Wildlife Service, P.O. Box 1967, Hurstville, Australia 2220) 1988. *The botany of old cemeteries. Cunninghamia* 2(1): 97-105. — The floristic composition, both native and exotic, of seventeen cemeteries in the Campbelltown area, south-west of Sydney, was examined. A total of 505 species was recorded, 193 native, 235 exotic-naturalized, 16 native-planted and 61 exotic-planted species. Some old cemeteries may be worthy of protection as small reserves because of the reasonably high proportion (here 21-59%) or rarity of native species recorded in them. The data indicate the need to judge each on its merits. Herbicides and excessive cleaning-up are major threats.

Introduction

In long-established rural areas, remnant herbaceous or groundlayer vegetation (if it exists at all) is often confined to service corridors, and semi-neglected sites such as old cemeteries. In adjacent rural lands, however, most of the native groundlayer species have been destroyed by a century of intensive cultivation or grazing. Leigh, Boden & Briggs (1984) attribute the extinction of 57% of the 'now extinct' Australian species to agricultural practices.

The flora of service corridors generally has a mixture of native species and 'roadside weeds' of exotic origin. Such areas may be regularly or intermittently managed, traditionally by burning, but now increasingly by herbicide spraying.

Old cemeteries may have a more varied flora than service corridors. There may be some remnants of the original native flora mixed with cultivated plants, including those deliberately planted either for their funerary symbolism or personal associations, others that have become naturalized, and weeds. Price (1979) recorded nearly 400 species for Sydney's Rookwood Cemetery and adjacent hospital and golfcourse grounds; Betteridge (1981) listed 122 species for Gore Hill Cemetery.

There is public interest in the historical significance of old cemeteries (for example see Gilbert 1980) but their plants have been generally overlooked. Yet these may be important in terms of conservation and horticulture. Loneragan (1975) used a cemetery at Gingin near Perth to study patterns in vegetation using 40 native species. The cemetery had been regularly mown and burnt, but evidently included a valuable natural remnant in an otherwise agricultural landscape. Rookwood Cemetery contains valuable pockets of remnant native vegetation and includes populations of the rare shrub, *Acacia pubescens* (Price, 1979). Such sites may also provide refuges for dependent fauna. Key (1978) indicates two grasshopper species now largely restricted to cemeteries in the Southern Tablelands because of the changes to the original grasslands. As sources of old-fashioned cultivar material, roses in particular, cemeteries and churchyards

are important to horticulturists and collectors (Nottle, 1983). Recent cleaning at Rookwood endangered a number of old roses well known to specialist groups such as the Heritage Rose Society (Stephanie Murphy pers. comm.).

Our aim was to examine the potential conservation value of a number of old cemeteries in terms of their native and horticultural floras. The cemeteries chosen are south-west of Sydney, on the Cumberland Plain.

Methods

Plant species are listed from 17 cemeteries at Appin, Campbelltown, Liverpool, Camden, Narellan and Denham Court; all sites on the low-rainfall part of the Cumberland Plain, south-west of Sydney (Figure 1). These cemeteries are all on Wianamatta Shale soils that originally carried woodland of *Eucalyptus moluccana*, *E. tereticornis* and *E. crebra* with a grassy, predominantly *Themeda australis*, understorey. All the cemeteries are more than 60 years old, most over 120 years old and include some of the oldest in Australia (Table 1). Cemeteries chosen all had some native species, those with only mown grass were not included.

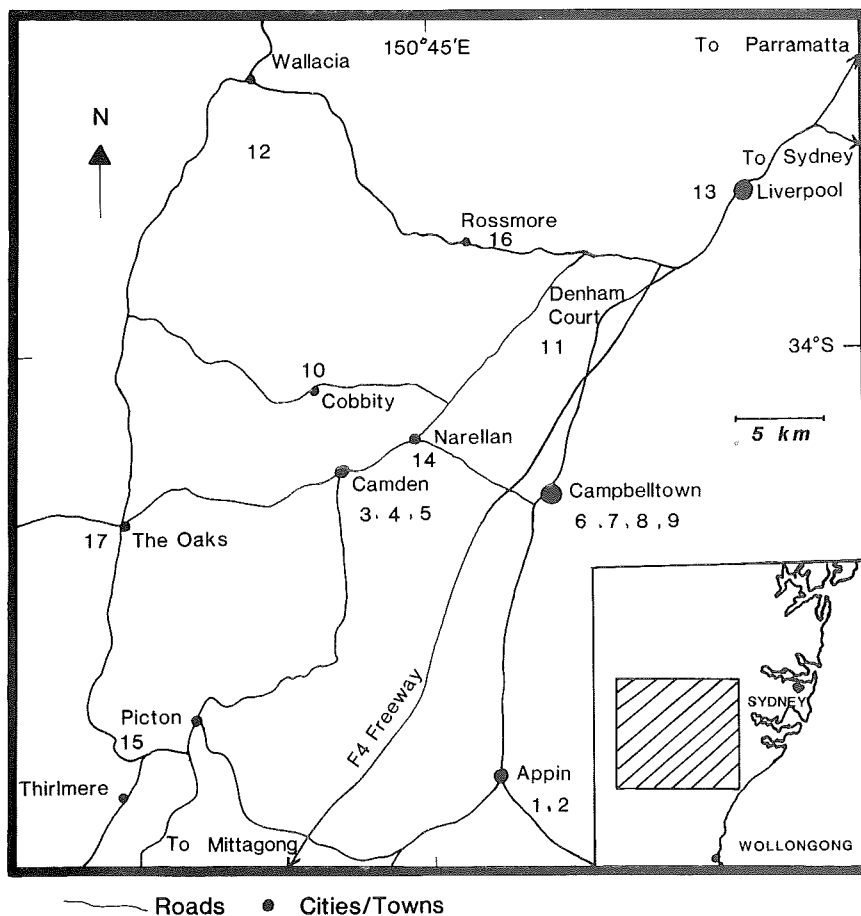


Figure 1. Location of cemeteries to the south-west of Sydney. Code numbers refer to Table 1.

Table 1: Code number, location, area and age of the 17 cemeteries examined

No.	Location	Approx. area (ha)	Oldest grave (year)
1.	Appin, St. Mark's Anglican Church	0.8	1842
2.	Appin, St. Bede's Roman Catholic Cemetery	0.6	1842
3.	Camden, General Cemetery	0.6	1924
4.	Camden, St. John's Anglican Church	1.6	1845
5.	Camden, St. Paul's Roman Catholic Cemetery, Cawdor Rd.	0.6	1843
6.	Campbelltown, Anglican Church of St. Peter	1.6	1823
7.	Campbelltown, St. John's Roman Catholic Cemetery	1.6	1827
8.	Campbelltown, Presbyterian Cemetery*	0.8	1848
9.	Campbelltown, Methodist Congregational Cemetery*	0.4	1865
10.	Cobbity, St. Paul's Anglican Church	0.8	1831
11.	Denham Court, Anglican Church of the Virgin Mary	1.2	1847
12.	Greendale, Old Roman Catholic Cemetery	0.6	1844
13.	Liverpool, General Cemetery†	2.0	—
14.	Narellan, St. Thomas' Anglican Church	0.8	1860
15.	Picton, General Cemetery	1.6	1840
16.	Rossmore, Anglican Church of the Holy Innocents	0.4	1846
17.	The Oaks, St. Matthew's Anglican Cemetery	0.6	1852

* Signifies a closed cemetery.

† Including that part of the old cemetery which was converted into the Pioneers Memorial Park in 1970–1974.

All species within the cemetery grounds were recorded, whether growing along paths, on graves, or in remnant natural vegetation. Cemetery boundaries were generally indicated by fences or clearly separated from other areas by mown lawns. Recordings were made in March, April and October 1984. Plant identifications were made by one of us (E.J.M.) and confirmed, where necessary, at the National Herbarium of New South Wales. Notes were made on the size, condition and management of the cemeteries.

Species were regarded as either native or exotic–naturalized if listed for the Central Coast Botanical Subdivision by Jacobs & Pickard (1981). Species not listed were regarded as planted, either as native–planted or exotic–planted. Five life-form classes: ferns, grasses, herbs and subshrubs, climbers and creepers, and shrubs and trees were used. The full species list is available from the Royal Botanic Gardens on request.

Results

The survey showed a rich flora with 505 species (Table 2). The number of species per cemetery ranged from 51 at Greendale (cemetery no. 12) to 164 at Liverpool (no. 13), with an average of 100 species per cemetery (Table 3).

Although only one species, the exotic herb *Plantago lanceolata* was recorded in all 17 cemeteries, 45 species were recorded from at least 50% of the cemeteries (9 or more) including 16 species from at least 75% of them (13 or more). The most frequent species were grasses and herbs.

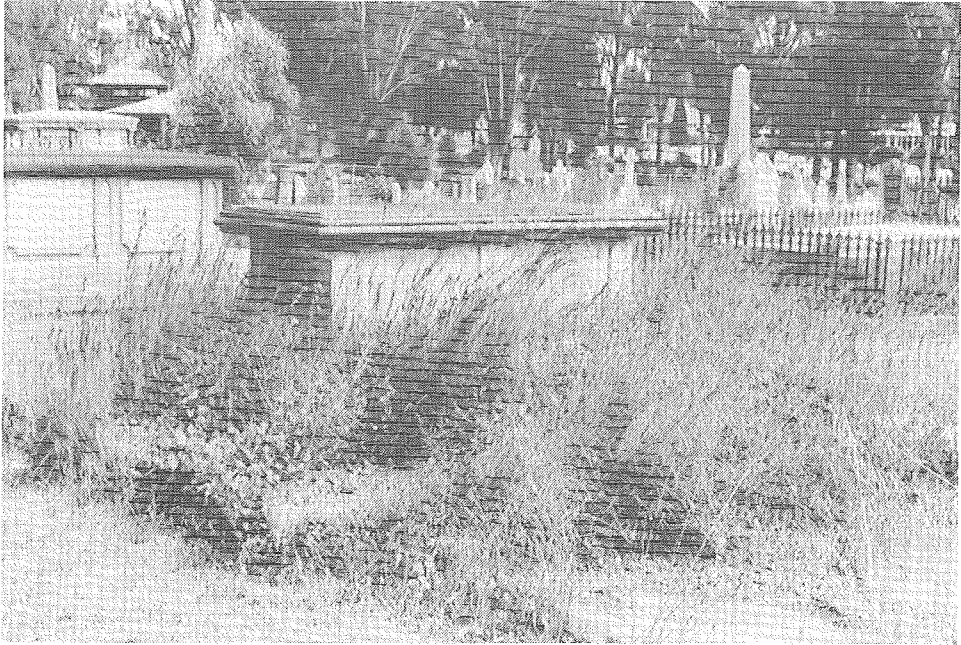


Figure 2. Grave with native *Themeda australis* and mixture of other species (Campbelltown — St Peter's Cemetery).

a) Native species

Of the flora, 193 (38%) were native species (Table 2). Of these 48% were herbs and subshrubs, 25% grasses and 20% shrubs. The number of native species per cemetery (Table 3) ranged from 17 at Cobbitty Cemetery (no. 10) to 91 species at Liverpool (no. 13) (mean = 43, SD = 19). The native component made up between 21 and 59% of individual cemeteries (Table 3). The main native life-forms are herbs and subshrubs, from 8–47 species per cemetery, followed by grasses, 6–25 species per cemetery. Least important are ferns, 0–2 species per cemetery. The number of native species was not related to the size of the cemetery.

Native species either occurred in small bush remnants in undeveloped or little used parts of the cemetery, or along paths and on grave plots. Even when cemetery paths were mown, plants managed to survive in microhabitats such as the cracks in grave slabs, spaces between adjacent graves, along grave surrounds and edges, on fenced-off graves (often protected by iron surrounds), in the shade of headstones and under and around perimeter fences.

Liverpool (no. 13), with 91 native species (55% of the recorded species) had the most native species. It is largest in area and has had a fairly low intensity of usage and maintenance. Most of the native species are associated with old paths and fencelines as there are no distinct remnants of natural vegetation.

The lowest number of native species occurred in Cobbitty Cemetery (no. 10), where only 17 species (22% of the recorded species) were native. This cemetery is carefully maintained, has no uncleared native vegetation and a high percentage of exotic-planted species. Most of the native species at Cobbitty were growing on the grave plots themselves, rather than in untended parts of the cemetery.

Even in cemeteries with a low total number of species, native species may still comprise a very significant percentage. Greendale Cemetery (no. 12) had the

Table 2: Total numbers of species recorded by life-form and origin.

Origin	Life-form					Total	Percentage
	A	B	C	D	E		
Native	4	49	92	9	39	193	38
Native-planted	0	0	1	0	15	16	3
Exotic	0	44	142	17	32	235	47
Exotic-planted	0	0	19	0	42	61	12
Total	4	93	254	26	128	505	
Percentage	1	18	50	5	26		100

(Life-forms: A = ferns, B = grasses, C = herbs and subshrubs, D = climbers and creepers, E = shrubs and trees.)

Table 3: Number and percentage of species recorded for the 17 cemeteries.

Cemetery	Native		Native-planted		Exotic-naturalized		Exotic-planted		Total
	N	%	N	%	N	%	N	%	
1.	41	(48)	0	(0)	39	(45)	6	(7)	86
2.	33	(50)	0	(0)	26	(39)	7	(11)	66
3.	35	(31)	3	(3)	69	(61)	7	(6)	114
4.	41	(30)	5	(4)	78	(57)	12	(9)	136
5.	30	(37)	0	(0)	50	(61)	2	(2)	82
6.	54	(36)	2	(2)	77	(52)	15	(10)	148
7.	48	(41)	4	(5)	57	(48)	9	(8)	118
8.	31	(31)	1	(2)	59	(59)	8	(8)	99
9.	24	(33)	0	(0)	41	(57)	7	(10)	72
10.	17	(21)	4	(5)	44	(55)	14	(19)	79
11.	45	(49)	1	(2)	39	(43)	6	(7)	91
12.	30	(59)	0	(0)	21	(41)	0	(0)	51
13.	91	(55)	3	(2)	64	(39)	6	(4)	164
14.	69	(55)	1	(1)	48	(39)	6	(5)	124
15.	33	(41)	1	(2)	40	(49)	7	(9)	81
16.	67	(49)	0	(0)	59	(43)	10	(8)	136
17.	34	(58)	6	(10)	16	(27)	3	(5)	59
Mean	43		2		49		7		100
SD	19		2		18		4		33

Cemeteries numbered as in Table 1.

lowest number of species (51) of any of the cemeteries, yet native species comprised 59% of these. This cemetery is unused and unmanaged.

Infrequent species and in particular those confined to one site made up about one-third of the native species and a similar proportion of the exotics (Table 4). Of the 74 native species found at only one site, 43% were found at Liverpool (no. 13) and 18% at Appin (no. 1). All except four cemeteries contained at least one infrequent native species.

Two native species coded as rare by Leigh, Briggs & Hartley (1981) were recorded. *Pimelea spicata*, coded 3RC (a rare species with a geographic range over 100km but not currently considered endangered or vulnerable), was found in a corner of the Narellan Cemetery. This is one of only three known surviving populations of this endemic Sydney species and a recoding of 3E (an endangered species with a range over 100km 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) has been recommended. *Acacia pubescens*, coded as 2E (an endangered species with a maximum geographic range of less than 100km), occurs as an uncommon plant at Liverpool Cemetery. The distribution of this species is similarly reduced. Leigh, Boden & Briggs (1984) state that land clearance for urban development poses a major threat to its continued survival in the wild. Another rare species, *Swainsona monticola*, was previously collected in St Paul's Roman Catholic Cemetery, Cawdor Rd, Camden (no. 5) by one of us (E.J.M.) in October 1965. The plants were destroyed during subsequent 'cleaning-up' and were absent in 1984. As this was the only known site in the Sydney area, the species is now locally extinct.



Figure 3. Grave with old rose cultivar (Picton General Cemetery).

b) Exotic-naturalized species

There were 235 exotic-naturalized species making up 47% of the total flora (Table 2). The mean number of exotic-naturalized species per cemetery ranged from 16 to 78 (mean = 49, SD = 18) (Table 3) which made up between 27% and 61% of the total number of species occurring in individual cemeteries. The main components of the exotic flora are herbs and sub-shrubs (C), 5-55 species per cemetery, followed by grasses (B), 7-21 species per cemetery. Exotic-naturalized species occupied similar microhabitats to native species.

Infrequent species, and in particular those confined to one site, made up about one-third of the exotics (Table 4). Infrequent exotic-naturalized species were found in all cemeteries (ranging from 1-12 per cemetery), but were much more evenly spread than native species.

Uncommon exotic species include *Oxalis bifurca* for which St Peter's Campbelltown (no. 6), is the only known locality in the Sydney Region (Beadle, Evans & Carolin, 1982). Species also occur which are naturalized locally but are not included in Beadle *et al.*, (1982), for example *Ornithogalum caudatum* at Rossmore (no. 16).

Table 4: Number of infrequent species* recorded for the 17 cemeteries.

Cemetery	Native	Exotic-naturalized	Native-planted and exotic-planted
1.	13	4	3
2.	6	5	3
3.	2	7	3
4.	2	10	4
5.	1	4	1
6.	1	8	4
7.	1	5	0
8.	0	2	2
9.	1	1	1
10.	1	8	5
11.	0	4	0
12.	0	3	0
13.	32	12	5
14.	9	5	1
15.	0	3	1
16.	2	5	3
17.	3	2	3

* Recorded at only one site.
Cemeteries numbered as in Table 1.

c) Native-planted

These are Australian native species that are not naturally found in the Campbelltown area. Only 16 native-planted species were recorded, 3% of the total species, and almost all were trees and shrubs. They were recorded at 11 of the 17 cemeteries. Tree species are mainly *Eucalyptus* and the shrubs mainly contemporary horticultural species. Two native species used in older plantings are *Araucaria bidwillii* and *Grevillea robusta*.

d) Exotic-planted

The exotic-planted species totalled 61 or 12% of the flora (Table 2). Two-thirds were trees and shrubs. They were found in almost all cemeteries (ranging from 0–15 species per cemetery) (Table 3). These include a number of exotic species, varieties and cultivars surviving from the Victorian era. Some were planted for their traditional associations, for example the Funereal Cypress, *Cupressus funebris* (Betteridge 1981). Other funereal plants recorded were *Pinus pinea* and the native *Araucaria bidwillii*.

The Victorian garden plants include a number of old rose species (*Rosa odorata*, *R. chinensis* var. *minima*) and unidentified cultivars. Some of the Victorian garden plantings reflect times before the potential for some of these hardy plants to become weeds elsewhere, particularly in bushland, was foreseen. *Oxalis* spp., *Vinca major* (Periwinkle) and *Lonicera japonica* (Honeysuckle), for instance, are now usually regarded as weeds.

Discussion

There is considerable conservation value in preserving different genotypes or variants of native species in areas where all other natural populations have disappeared, or are likely to be destroyed in the future. The network of small natural areas fulfils this role (National Trust of Australia–NSW 1984). Although not normally considered part of this network, old cemeteries may be important.

The evidence supports the case for considering some old cemeteries as having potential botanical and horticultural, as well as the normally accepted historical, conservation value. Old cemeteries may contain a surprising number of both native and exotic species, including a high proportion of 'infrequent' species. The latter include rare or locally restricted native species. Some cemeteries have higher proportions of infrequent species than others, but some may be found even in relatively tidy cemeteries. This study does not attempt to justify blanket protection of all old cemeteries, but contains data suggesting that each should be judged on its merits after survey.

The long-term conservation value (speaking in terms of centuries) of such areas is impossible to evaluate, although the older cemeteries have evidently maintained populations of species successfully for over a century. The loss of *Swainsona monticola* from one cemetery however, indicates their vulnerability to unsympathetic management. In particular herbicide spraying and excessive neatness should be avoided (see Appendix). Regrettably since the survey was completed several of the cemeteries have been sprayed or completely cleared.

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Appendix

Some recommended management procedures that will help maintain maximum species richness, particularly of native species, in a cemetery:

- a) remnant stands of native vegetation should be retained
- b) blanket use of herbicides should be avoided
- c) the judicious use of fire is preferable to the use of chemical sprays
- d) hand weeding and stump poisoning should be used to eradicate woody weeds such as lantana and privet
- e) mowing should be confined to walkways and access areas
- f) where native plants are a component of grassy areas, mowing should not take place until late spring (late November) in order to allow native lillies, grasses and terrestrial orchids to flower and set seed
- g) mower blades should be raised a few centimetres off the ground so that the area is not cut back to bare earth
- h) as there is often a concentration of native species along fencelines, a 1–2 metre wide uncleared strip should be left around fencelines where possible
- i) grave plots should be left as undisturbed as possible
- j) if disturbance to an area is inevitable due to expansion of the cemetery, the possibility of transplanting young plant specimens (or older specimens if there is no young material available) to an unused part of the cemetery should be investigated, especially if rare plants are involved
- k) endangered plants should be left undisturbed, except for careful weeding to minimise competition and crowding.