

**APPENDIX 1.** All taxa (scientific name and family) recorded during all surveys at Kirramingly Nature Reserve. Also shown are species origin (N, native; I, introduced), growth form (F, forb; G, grass; GR, graminoid; S, shrub; SS, sub-shrub; T, Tree; O, other) and life cycle (P, perennial; A, annual or biennial; S, short-lived perennial). Species percentage frequency in 76 quadrats surveyed between 1998 and 2004 (% Freq). Fisher's exact test was used to identify differences in the frequency of species between (1) grazed and ungrazed quadrats; and (2) cultivated and uncultivated quadrats. Species with less than five occurrences for each test were ignored, because low frequencies could have been due to chance. \* significant effect at  $\alpha = 0.05$ . Some species showed positive (+) or negative (-) associations in ordination (t – value biplots) but were not significant in Fisher's exact tests. A response of '0' indicates no detected association or too few occurrences to be included in analysis. Habitat refers to sites in which species were uniquely recorded: NC, not cultivated sites only; C, cultivated sites only; G, grazed sites only; NC + C, not cultivated and cultivated sites; NC + C + G, not cultivated, cultivated and grazed sites; NC + G, not cultivated and grazed sites; C + G, cultivated and grazed sites; and NA, not recorded during February-March sampling. Uncultivated (NC) and cultivated (C) sites were not grazed.

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Abutilon oxycarpum</i>	Malvaceae	N	F	P	7	0	0	NC + G
<i>Acacia farnesiana</i>	Fabaceae	I	S	P	96	0	0	NC + C + G
<i>Acacia pendula</i>	Fabaceae	N	T	P	13	0	0	NC + G
<i>Acacia stenophylla</i>	Fabaceae	N	T	P	11	0	0	NC
<i>Alectryon oleifolius</i> subsp. <i>canescens</i>	Sapindaceae	N	T	P	3	0	0	G
<i>Alternanthera denticulata</i>	Amaranthaceae	N	F	A	63	0	0	NC + C + G
<i>Alternanthera nodiflora</i>	Amaranthaceae	N	F	A	16	0	0	NC + C

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Amaranthus macrocarpus</i> var. <i>pallidus</i>	Amaranthaceae	N	F	A	9	0	0	NC + C + G
<i>Ammannia multiflora</i>	Lythraceae	N	F	A	1	0	0	NC
<i>Amyema quandang</i> var. <i>quandang</i>	Loranthaceae	N	O	P	7	0	0	G
<i>Aristida latifolia</i>	Poaceae	N	G	P	25	0	0	NC + C + G
<i>Aristida leptopoda</i>	Poaceae	N	G	P	93	-	-	NC + C + G
<i>Aristida platychaeta</i>	Poaceae	N	G	P	30	0	0	NC + C + G
<i>Asperula cunninghamii</i>	Rubiaceae	N	F	P	47	- * (2002 only)	- * (2002, 2004)	NC + G
<i>Aster subulatus</i>	Asteraceae	I	F	A	21	0	0	NC + C + G
<i>Astrebla elymoides</i>	Poaceae	N	G	P	88	0	-	NC + C + G
<i>Astrebla lappacea</i>	Poaceae	N	G	P	53	0	- * (2004 only)	NC + C + G
<i>Atalaya hemiglauca</i>	Sapindaceae	N	T	P	3	0	0	G
<i>Atriplex semibaccata</i>	Chenopodiaceae	N	SS	P	66	+	+	NC + C + G
<i>Atriplex suberecta</i>	Chenopodiaceae	N	F	A	9	0	0	NA
<i>Austrodanthonia bipartita</i>	Poaceae	N	G	P	58	0	- * (2004 only)	NC + C + G
<i>Austrostipa aristiglumis</i>	Poaceae	N	G	P	18	0	0	NC + G
<i>Avena fatua</i>	Poaceae	I	G	A	9	0	0	C
<i>Bidens subalternans</i>	Asteraceae	I	F	P	1	0	0	C
<i>Boerhavia dominii</i>	Nyctaginaceae	N	F	P	88	0	0	NC + C + G
<i>Brachycome ciliaris</i> var. <i>ciliaris</i>	Asteraceae	N	F	P	14	0	0	NC + C + G
<i>Brachycome ciliaris</i> var. <i>subintegrifolia</i>	Asteraceae	N	F	P	24	0	0	NC + C + G
<i>Brassica juncea</i>	Brassicaceae	I	F	A	1	0	0	C
<i>Bromus cartharticus</i>	Poaceae	I	G	A	7	0	0	C + G
<i>Bulbine bulbosa</i>	Asphodelaceae	N	GR	P	1	0	0	NA
<i>Caesia calliantha</i>	Anthericaceae	N	GR	P	4	0	0	NA
<i>Calotis scabiosifolia</i> var. <i>scabiosifolia</i>	Asteraceae	N	F	P	29	0	- * (2002 only)	NC + G
<i>Capparis lasiantha</i>	Capparaceae	N	S	P	9	+	0	NC + C + G
<i>Carex inversa</i>	Cyperaceae	N	GR	P	4	0	0	NC
<i>Casuarina cristata</i>	Casuarinaceae	N	T	P	5	0	0	NC + G

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Centaurea melitensis</i>	Asteraceae	I	F	A	13	0	0	NC + C
<i>Centipeda thespidioides</i>	Asteraceae	N	F	P	1	0	0	NC
<i>Chamaesyce drummondii</i>	Euphorbiaceae	N	F	P	74	0	- * (2002 only)	NC + C + G
<i>Chloris truncata</i>	Poaceae	N	G	S,A	91	0	0	NC + C + G
<i>Chloris ventricosa</i>	Poaceae	N	G	P	16	0	0	NC + C + G
<i>Cirsium vulgare</i>	Asteraceae	I	F	A	18	0	0	NC + C + G
<i>Citrullus lanatus</i> var. <i>lanatus</i>	Cucurbitaceae	I	F	A	1	0	0	NA
<i>Convolvulus erubescens</i>	Convolvulaceae	N	F	P	79	0	0	NC + C + G
<i>Conyza bonariensis</i>	Asteraceae	I	F	A	49	-	0	NC + C + G
<i>Crotalaria dissitiflora</i> subsp. <i>dissitiflora</i>	Fabaceae	N	F	P	20	-	0	NC + C
<i>Cucumis melo</i> subsp. <i>agrestis</i>	Cucurbitaceae	N	F	A	17	0	+ * (2004 only)	NC + C
<i>Cucumis myriocarpus</i>	Cucurbitaceae	I	F	A	8	0	0	NC + C
<i>Cullen tenax</i>	Fabaceae	N	F	P	53	0	0	NC + C + G
<i>Cynodon dactylon</i>	Poaceae	N	G	P	5	0	0	NC
<i>Cyperus bifax</i>	Cyperaceae	N	GR	P	64	0	-	NC + C + G
<i>Cyperus concinnus</i>	Cyperaceae	N	GR	P	3	0	0	G
<i>Cyperus fulvus</i>	Cyperaceae	N	GR	P	1	0	0	NC
<i>Dactyloctenium radulans</i>	Poaceae	N	G	A	20	+	+	NC + C + G
<i>Daucus glochidiatus</i>	Apiaceae	N	F	A	16	0	0	NA
<i>Desmodium campylocaulon</i>	Fabaceae	N	F	P,A	66	- * (2002 only)	-	NC + C + G
<i>Dichanthium sericeum</i>	Poaceae	N	G	P	91	0	0	NC + C + G
<i>Dichondra repens</i>	Convolvulaceae	N	F	P	8	0	0	NC + G
<i>Digitaria divaricatissima</i>	Poaceae	N	G	P	70	0	0	NC + C + G
<i>Digitaria hystrichoides</i>	Poaceae	N	G	P	13	0	0	NA
<i>Diplachne fusca</i>	Poaceae	N	G	A	1	0	0	NC
<i>Diplachne parviflora</i>	Poaceae	N	G	A	1	0	0	NC
<i>Echinochloa colona</i>	Poaceae	N	G	A	3	0	0	C
<i>Eclipta platyglossa</i>	Asteraceae	N	F	A	20	-	0	NC + C
<i>Einadia hastata</i>	Chenopodiaceae	N	SS	P	5	+	0	C + G
<i>Einadia nutans</i> subsp. <i>linifolia</i>	Chenopodiaceae	N	F	P	67	0	0	NC + C + G

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Einadia polygonoides</i>	Chenopodiaceae	N	F	P,A	25	0	0	NC + C + G
<i>Eleocharis pallens</i>	Cyperaceae	N	GR	P	13	0	0	NC
<i>Enchylaena tomentosa</i>	Chenopodiaceae	N	SS	P	5	+	0	C + G
<i>Enneapogon gracilis</i>	Poaceae	N	G	A,P	11	0	0	NC + C + G
<i>Enteropogon acicularis</i>	Poaceae	N	G	P	79	0	0	NC + C + G
<i>Eragrostis cilianensis</i>	Poaceae	I	G	A	1	0	0	NC
<i>Eragrostis leptocarpa</i>	Poaceae	N	G	A,P	5	0	0	NC
<i>Eragrostis parviflora</i>	Poaceae	N	G	A	39	0	0	NC + C + G
<i>Eremophila debilis</i>	Myoporaceae	N	SS	P	32	0	0	NC + C + G
<i>Eremophila mitchellii</i>	Myoporaceae	N	T	P	3	0	0	G
<i>Eriochloa crebra</i>	Poaceae	N	G	P	8	0	+	NC + C
<i>Eriochloa procera</i>	Poaceae	N	G	P	1	0	0	NA
<i>Eriochloa pseudoacrotricha</i>	Poaceae	N	G	A,P	87	0	-	NC + C + G
<i>Eryngium plantagineum</i>	Apiaceae	N	F	A	25	-	- * (2002 only)	NC
<i>Eucalyptus coolabah</i> subsp. <i>excerata</i>	Myrtaceae	N	T	P	0	0	0	NA
<i>Euchiton sphaericus</i>	Asteraceae	N	F	A	33	0	0	NC + C + G
<i>Eulalia aurea</i>	Poaceae	N	G	P	38	0	0	NC + C + G
<i>Fimbristylis dichotoma</i>	Cyperaceae	N	GR	P	3	0	0	NC
<i>Frankenia serpyllifolia</i>	Frankeniaceae	N	SS	P	4	0	0	NC + G
<i>Geranium solanderi</i> var. <i>solanderi</i>	Geraniaceae	N	F	P	4	0	0	NC
<i>Glycine latifolia</i>	Fabaceae	N	F	P	24	-	-	NC + C + G
<i>Glycine tabacina</i>	Fabaceae	N	F	P	3	0	0	NA
<i>Gomphrena celosioides</i>	Amaranthaceae	I	F	A	3	0	0	G
<i>Goodenia fascicularis</i>	Goodeniaceae	N	F	P	66	0	0	NC + C + G
<i>Goodenia heteromera</i>	Goodeniaceae	N	F	P,A	3	0	0	NC + G
<i>Haloragis aspera</i>	Haloragaceae	N	F	A,P	34	0	- * (2002 only)	NC + C + G
<i>Haloragis glauca</i>	Haloragaceae	N	F	P	1	0	0	NA
<i>Hedypnois rhagadioloides</i>	Asteraceae	I	F	A	17	0	0	NA
<i>Hibiscus trionum</i>	Malvaceae	N	F	A	13	0	+	NC + C + G
<i>Hordeum leporinum</i>	Poaceae	I	G	A	4	0	0	NA

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Ipomoea lonchophylla</i>	Convolvulaceae	N	F	A	4	0	+	C + G
<i>Iseilema membranaceum</i>	Poaceae	N	G	A	20	0	0	NC + C + G
<i>Juncus aridicola</i>	Juncaceae	N	GR	P	11	0	0	NC + G
<i>Juncus usitatus</i>	Juncaceae	N	GR	P	28	0	0	NC + C
<i>Lachnagrostis filiformis</i>	Poaceae	N	G	A	3	0	0	NC
<i>Lactuca serriola</i>	Asteraceae	I	F	A	7	0	0	NA
<i>Leiocarpa panaetioides / tomentosa</i>	Asteraceae	N	SS	P	37	0	0	NC + C + G
<i>Leiocarpa websteri</i>	Asteraceae	N	SS	P	76	- * (2002 only)	- * (2004 only)	NC + C + G
<i>Lepidium bonariense</i>	Brassicaceae	I	F	A	4	0	0	NC + G
<i>Leptochloa digitata</i>	Poaceae	N	G	P	5	0	0	NC
<i>Leptochloa divaricatissima</i>	Poaceae	N	G	P	36	0	+ * (2002 only)	NC + C + G
<i>Linum marginale</i>	Linaceae	N	F	P	4	0	0	NC
<i>Lomandra multiflora</i>	Lomandraceae	N	GR	P	1	0	0	NC
<i>Lycium ferocissimum</i>	Solanaceae	I	S	P	9	+	0	NC + G
<i>Maireana aphylla</i>	Chenopodiaceae	N	SS	P	61	0	- * (2002 only)	NC + C + G
<i>Maireana decalvens</i>	Chenopodiaceae	N	SS	P	34	+ * (2002 only)	0	NC + C + G
<i>Maireana microphylla</i>	Chenopodiaceae	N	SS	P	55	0	0	NC + C + G
<i>Malvastrum americanum</i>	Malvaceae	I	F	A	64	0	0	NC + C + G
<i>Marrubium vulgare</i>	Lamiaceae	I	F	P	3	0	0	C
<i>Marsilea drummondii</i>	Marsileaceae	N	O	P	20	0	0	NC + G
<i>Medicago polymorpha</i>	Fabaceae	I	F	A	22	0	0	NC + C + G
<i>Medicago truncatula</i>	Fabaceae	I	F	A	5	0	0	NA
<i>Mimulus gracilis</i>	Scrophulariaceae	N	F	P,A	4	0	0	NC
<i>Minuria integerrima</i>	Asteraceae	N	F	P	18	0	0	NC + C + G
<i>Myoporum montanum</i>	Myoporaceae	N	S	P	7	0	+	C + G
<i>Neptunia gracilis</i>	Fabaceae	N	F	P	82	0	0	NC + C + G
<i>Nicotiana megalosiphon</i>	Solanaceae	N	F	A	1	0	0	NC
<i>Opuntia stricta</i>	Cactaceae	I	SS	P	11	0	0	NC + G
<i>Oxalis perennans</i>	Oxalidaceae	N	F	P	83	-	0	NC + C + G
<i>Panicum buncei</i>	Poaceae	N	G	P	58	0	- * (2002 only)	NC + C + G
<i>Panicum decompositum</i>	Poaceae	N	G	P	88	-	0	NC + C + G

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Panicum effusum</i>	Poaceae	N	G	P	5	0	0	NC + C
<i>Panicum queenslandicum</i> var. <i>queenslandicum</i>	Poaceae	N	G	P	62	- * (2002 only)	- * (2004 only)	NC + C + G
<i>Paspalidium aversum</i>	Poaceae	N	G	P	4	0	0	NC + G
<i>Paspalidium constrictum</i>	Poaceae	N	G	P	16	+	0	NC + C + G
<i>Paspalidium globoideum</i>	Poaceae	N	G	P	34	0	0	NC + C + G
<i>Paspalidium jubiflorum</i>	Poaceae	N	G	P	7	0	0	NC + C
<i>Phalaris aquatica</i>	Poaceae	I	G	P	1	0	0	NA
<i>Phalaris paradoxa</i>	Poaceae	I	G	A	9	0	0	C
<i>Phyllanthus virgatus</i>	Euphorbiaceae	N	F	P	76	- * (2002 only)	0	NC + C + G
<i>Physalis lanceifolia</i>	Solanaceae	I	F	A	13	0	0	NC + C
<i>Physalis virginiana</i>	Solanaceae	I	F	P	9	0	+	NC + C
<i>Picris hieracioides</i>	Asteraceae	I	F	A	3	0	0	NC + G
<i>Pimelea linifolia</i>	Thymelaeaceae	N	S	P	14	0	0	NC + G
<i>Pimelea microcephala</i>	Thymelaeaceae	N	S	P	11	0	0	NC + G
<i>Pimelea neo-anglica</i>	Thymelaeaceae	N	S	P	3	0	0	G
<i>Pittosporum phylliraeoides</i>	Pittosporaceae	N	T	P	3	0	0	G
<i>Plantago cunninghamii</i>	Plantaginaceae	N	F	A	11	0	0	NC + C
<i>Plantago debilis</i>	Plantaginaceae	N	F	A	4	0	0	NA
<i>Podolepis muelleri</i>	Asteraceae	N	F	A	7	0	0	NC
<i>Polymeria pusilla</i>	Convolvulaceae	N	F	P	1	0	0	NC
<i>Portulaca oleracea</i>	Portulacaceae	N	F	A	68	+ * (2002 only)	+	NC + C + G
<i>Pratia concolor</i>	Lobeliaceae	N	F	P	21	0	-	NC + C
<i>Proboscidea louisianica</i>	Martyniaceae	I	F	A	3	0	0	NC + C
<i>Ptilotus semilanatus</i>	Amaranthaceae	N	F	P	57	- * (2002 only)	- * (2002 only)	NC + C + G
<i>Pycnosorus chrysanthus</i>	Asteraceae	N	F	A	5	0	0	C
<i>Pycnosorus globosus</i>	Asteraceae	N	F	A	33	0	0	NC + C + G
<i>Rapistrum rugosum</i>	Brassicaceae	I	F	A	30	0	+ * (2002 only)	NC + C + G
<i>Rhagodia spinescens</i>	Chenopodiaceae	N	S	P	21	+	0	NC + G
<i>Rhynchosia minima</i>	Fabaceae	N	F	P	30	-	0	NC + C + G
<i>Rostellularia adscendens</i>	Acanthaceae	N	F	P	20	-	-	NC

Species	Family	Origin	Growth form	Life cycle	% Freq	Grazing response	Cultivation response	Habitat
<i>Rumex crispus</i>	Polygonaceae	I	F	P	16	0	0	NC + C
<i>Rumex crystallinus</i>	Polygonaceae	N	F	A	8	0	0	NC + C
<i>Salsola kali</i> var. <i>kali</i>	Chenopodiaceae	N	SS	A	4	+	0	G
<i>Salvia reflexa</i>	Lamiaceae	I	F	A	4	0	0	NC
<i>Sclerolaena anisacanthoides</i>	Chenopodiaceae	N	F	P	4	+	0	G
<i>Sclerolaena birchii</i>	Chenopodiaceae	N	SS	P	1	0	0	G
<i>Sclerolaena longicuspis</i>	Chenopodiaceae	N	SS	P	5	0	0	NC + C
<i>Sclerolaena muricata</i> var. <i>muricata</i>	Chenopodiaceae	N	SS	P	39	0	+ * (2002 only)	NC + C + G
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Chenopodiaceae	N	SS	P	83	-	0	NC + C + G
<i>Sclerolaena stelligera</i>	Chenopodiaceae	N	F	S,P	3	0	0	G
<i>Senecio quadridentatus</i>	Asteraceae	N	F	P	11	0	0	NA
<i>Setaria incrassata</i>	Poaceae	I	G	P	9	0	+	C
<i>Sida cunninghamii</i>	Malvaceae	N	F	P	9	0	0	NC + C + G
<i>Sida trichopoda</i>	Malvaceae	N	F	P	93	-	0	NC + C + G
<i>Silybum marianum</i>	Asteraceae	I	F	A	4	0	0	NC + C
<i>Solanum esuriale</i>	Solanaceae	N	F	P	86	0	0	NC + C + G
<i>Solanum nigrum</i>	Solanaceae	I	F	A	7	0	0	NC + C
<i>Sonchus oleraceus</i>	Asteraceae	I	F	A	41	- * (2002 only)	0	NC + C
<i>Sporobolus actinocladius</i>	Poaceae	N	G	S,P	4	+	0	G
<i>Sporobolus caroli</i>	Poaceae	N	G	A	82	0	0	NC + C + G
<i>Sporobolus creber</i>	Poaceae	N	G	P	3	0	0	NA
<i>Sporobolus mitchellii</i>	Poaceae	N	G	P	7	0	0	NC
<i>Stemodia glabella</i>	Scrophulariaceae	N	F	P	3	0	0	NC
<i>Swainsona luteola</i>	Fabaceae	N	SS	P	1	0	0	NC
<i>Swainsona murrayana</i>	Fabaceae	N	F	P	5	0	0	NA
<i>Swainsona queenslandica</i>	Fabaceae	N	SS	P	36	-	-	NC + C + G
<i>Tetragonia tetragonoides</i>	Aizoaceae	N	F	A	4	0	0	NC + G
<i>Thellungia advena</i>	Poaceae	N	G	P	71	0	0	NC + C + G
<i>Themeda avenacea</i>	Poaceae	N	G	P	61	-	- * (1998, 2002, 2004)	NC + G
<i>Tragus australianus</i>	Poaceae	N	G	A	1	0	0	G

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<i>Trianthema triquetra</i>	Aizoaceae	N	F	A	11	0	0	NC + G
<i>Tribulus micrococcus</i>	Zygophyllaceae	N	F	A	3	0	0	NC + C
<i>Urochloa panicoides</i>	Poaceae	I	G	A	9	0	0	NC + C + G
<i>Ventilago viminalis</i>	Rhamnaceae	N	T	P	3	0	0	G
<i>Verbena gaudichaudii</i>	Verbenaceae	N	F	P	54	0	0	NC + C + G
<i>Vittadinia cuneata</i>	Asteraceae	N	F	A,P	76	0	0	NC + C + G
<i>Wahlenbergia communis</i>	Campanulaceae	N	F	P	63	- * (2002 only)	0	NC + C + G
<i>Xanthium spinosum</i>	Asteraceae	I	F	A	11	0	0	NC + C