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Biodiversity responses to variation in fire regimes in the coal-seam gas region of south-eastern Queensland

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Executive summary

Highly fire-prone grassy woodlands dominate the coal-seam gas (CSG) development region of south-eastern Queensland, and the CSG industry has identified potential changes to fire regimes as a priority issue for managing impacts of CSG development on biodiversity. This project addresses the question: *How sensitive is the biota of these woodlands to variation in fire regimes?* It uses results from a controlled fire experiment to model the population dynamics of the dominant eucalypt trees, and examines associations between historical fire regimes and patterns of faunal diversity. Eucalypt populations appear to be limited primarily by water availability, with fire not being a major driver. Changes in tree populations are principally driven by the dynamics of the fire-sensitive native cypress pine (*Callitris columellaris*), which invades the grassy woodlands in the absence of fire.

Patterns of vertebrate diversity in relation to historical fire regimes were examined using 42 survey sites dominated by Poplar box (*Eucalyptus populneus*), located throughout the southern half of the Brigalow Belt bioregion. Information on fire history was obtained from interviews with local land managers, combined with analysis of Landsat imagery over a 25-year period (1987 – 2012). Totals of 48 reptile species, 63 bird species and 6 small mammal species were recorded. Patterns of ant diversity in relation to historical fire regimes were examined using 45 Poplar box/Silver-leaf ironbark (*E. melanophloia*) sites in the Maranoa region, with information on fire history provided by the local land managers. In total, 265 ant species from 50 genera were recorded.

Very frequent fire (≥3 fires over 15 yrs) was associated with reduced richness of reptiles generally, and of birds in woodland fragments. The latter appeared to be driven primarily by enhanced abundances of highly aggressive and predatory birds, which have been shown in previous studies to drive out many smaller woodland bird species. For small mammals and ants, richness was lowest in long-unburnt habitat with high cover of native cypress pine. These components of the fauna are adapted to open, grassy habitats, and so habitat favourability for them is reduced by increased canopy cover. We were unable to find any faunal species that was associated with long-unburnt habitat dominated by native cypress pine.

Taken together, our results show that the biota of grassy woodlands in the region is highly resilient to a range of moderate fire frequencies (fires occurring approximately every 10-20 yrs), and that it takes either very high fire frequency (i.e. every few years) or a long-term (several decades) absence of fire to cause substantial change in biodiversity. This situation is very different for fire-sensitive brigalow vegetation, where changed fire regimes due to invasion by buffel grass has been identified as a priority conservation threat. Our findings indicate that any modest change in regional fire regimes is unlikely to have a significant impact on biodiversity in eucalypt-dominated grassy woodlands. However, it is recommended that an ongoing fire monitoring programme be established to ensure that marked changes in regional fire regimes are not occurring as a result of CSG development.

1 Introduction

Australia is the most fire-prone of all continents, and its biota is strongly shaped by fire (Bradstock et al. 2012). Appropriate fire regimes are therefore critical for conservation management. Highly fire-prone grassy woodlands dominate the coal-seam gas (CSG) development region of south-eastern Queensland, and the CSG industry has identified fire as a priority issue for managing CSG impacts.

CSG development could potentially influence fire regimes in several ways. On one hand, increased human activity might lead to increased ignition sources and therefore to increased fire frequency. On the other, landscape-scale developments involving long linear structures can restrict the free movement of fire across the landscape, and so reduce fire frequency in isolated patches. The existence of valuable and fire-sensitive infrastructure might also lead to enhanced fire suppression and therefore a managed reduction in the incidence and severity of fires in the landscape. Such changes to the existing fire regime have the potential to lead to significant biodiversity impacts, by altering bio-geochemical cycling and other ecological processes, changing vegetation structure, and promoting invasive species.

The effects of fire on biodiversity have been extensively studied in Australian savannas of far northern Australia. For example, over recent decades four internationally significant long-term fire experiments have been conducted in the Top End of the Northern Territory, at Munmarlary (Russell-Smith et al. 2003), Kapalga (Andersen et al. 2003), the Territory Wildlife Park (Andersen 2014) and Melville Island (Richards et al. 2012), two of which are ongoing. However, no such studies have been conducted in Queensland's CSG region. Fire frequency in this subtropical region is far lower than jn the tropical savannas to the north, because the winter dry season is not so severe (Figure 1). Results from the savanna research therefore do not necessarily apply to the grassy biomes of south-eastern Queensland. It is therefore currently not possible to predict the impacts of either increased or reduced fire severity in the CSG region. More generally, the sensitivity of the regional biota to changed fire regimes, and the thresholds at which changed fire regimes cause substantial ecological impact, are unknown.

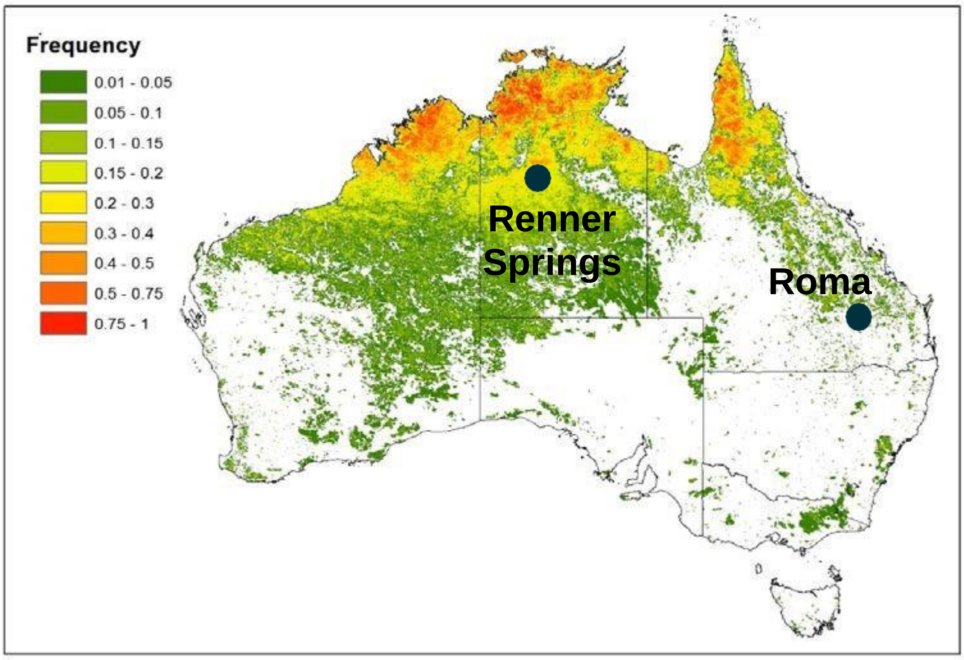
The GISERA fire and biodiversity project addresses this knowledge gap for the regionally dominant and most fire-prone biome, grassy eucalypt-dominated woodlands. It focusses on the question: *How sensitive is the biota of these woodlands to variation in fire regimes?*

The project comprises three components:

1. An experimental study of the effects of fire on eucalypt tree dynamics, led by Garry Cook from CSIRO Land & Water and Dr Rod Fensham from the Queensland Herbarium. It is widely appreciated that in the long-term absence of fire, the grassy woodlands are invaded by the fire-sensitive native cypress pine (*Callitris columellaris*), and that this can cause marked change in vegetation structure (Figure 2). However, the effects of fire on the dominant eucalypt species are poorly known. Results from this component are detailed in the manuscripts: G. D. Cook & R. Fensham. *Tree stand dynamics in central Queensland: Is fire irrelevant?*; and R. Fensham et al. *Climate, not fire, controls woody vegetation*

dynamics in sub-humid Eucalyptus *savanna*. It finds that eucalypt populations are limited primarily by water availability, and that fire is not a major driver. The effects of fire on habitat structure of grassy woodlands in the CSG region are therefore primarily through effects on the density of cypress pine, which increases with time since fire.

2. A study of the relationship between historical fire regimes and current patterns of vertebrate biodiversity, led by Dr Teresa Eyre from the Queensland Herbarium. Results from this component are detailed in the manuscript: Teresa J. Eyre, Daniel J. Ferguson, Luke D. Hogan, Annie L. Kelly, Michael T. Mathieson, Jesse Rowland, Melanie F. Venz, Jian Wang & Alan N. Andersen. *Relative effects of fire on fauna assemblages in fragmented grazing landscapes*. It finds that patterns of vertebrate diversity are strongly associated with historical fire regimes. For reptiles, species richness did not vary among sites experiencing low-to-moderate fire frequency, but was significantly lower at sites experiencing high fire frequency. A similar result was found for birds in woodland fragments, but this was strongly influenced by an interactions between bird species. Frequent fire reduces the shrub density, which provides favourable habitat for predatory birds and the highly aggressive noisy miner, which reduce the density and diversity of small woodland-dependent species. For small mammals, richness was lowest in long-unburnt habitat.
3. A study of the relationship between historical fire regimes and current patterns of ant biodiversity, led by Alan Andersen from CSIRO Land & Water. Ants are a dominant faunal group throughout Australia, and are the most widely used invertebrate indicator group for land management (Andersen & Majer 2004). The responses of ant communities to fire have been extensively studied throughout Australia. Ant diversity in open sclerophyll habitats tends to be promoted by fire, which favours the dominant open-adapted fauna (Andersen 1988; Andersen et al. 2006, 2009; Gosper et al. 2015). Details of this component are provided in the current report, which concludes with a discussion of the management implications of the results of the overall project.



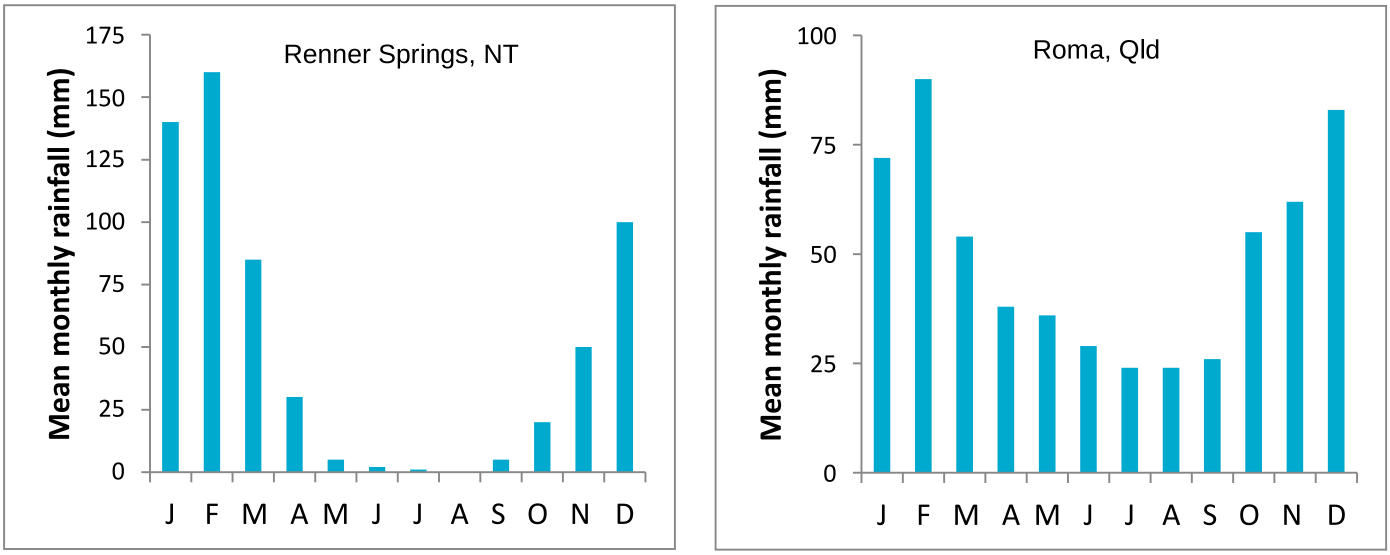


Figure 1. Map showing variation in fire frequency over a 25-yr period across Australia (top). The yellow and red areas (very high fire frequency) denote the tropical savanna zone. Roma (in the CSG region) and Renner Springs have the same mean annual rainfall (600 mm), but fire frequency is far lower in Roma. This can be explained by the more evenly distributed rainfall of Roma (bottom), such that fuels for fire remain relatively moist and therefore less flammable during the dry season.

Figure 2. In the long-term absence of fire, grassy woodlands (left) are invaded by fire-sensitive native cypress pine, resulting in major change to vegetation structure (right). [Photos: A. Andersen]

2 Influence of historical fire regimes on ant biodiversity

2.1 Methods

2.1.1 Study sites

A total of 45 grassy woodland sites dominated by Poplar box (*Eucalyptus populnea*) and Silver-leaf ironbark (*E. melanophloia*) were studied, distributed across three stations in the Maranoa region: Claravale (14 sites), Currawarra (11) and Myrtleville (20). These stations were chosen because their managers had long associations with them, and had detailed knowledge of their fire histories. The three long-unburnt sites at Myrtleville (M15A, M16A, M17; all with dense cover of cypress pine) were actually located on adjoining Glendonnell Station, within 100 m of its fence and immediately adjacent to frequently burnt sites at Myrtleville. Information on fire history was obtained from the station managers. Fire frequency during the past 30 years ranged from 0 to 12, and time since the last fire ranged from 1 to >50 years (Table 1).

Table 1. Study sites and their summary fire histories. N – the number of fires in the 30 yrs up to 2013; YRS = the number of years since the last fire, as at 2013.

CLARAVALE	N	YRS	CURRAWARRA	N	YRS	MYRTLEVILLE	N	YRS
C2B	0	>50	**Cu6**	3	12	**M1**	8	1
C3A	3	2	**Cu8**	3	12	**M2**	8	1
C3B	3	2	**Cu9A**	1	12	**M3**	8	1
C4	3	2	**Cu9B**	1	12	**M4**	2	1
C5A	1	15	**Cu10**	2	4	**M5**	2	1
C5B	1	5	**Cu12**	2	1	**M6**	8	1
C6A	0	>50	**Cu13**	2	1	**M7**	8	1
C6B	0	>50	**Cu14**	1	12	**M8**	8	1
C7A	1	2	**Cu15**	2	2	**M9**	8	1
C7B	1	2	**Cu16A**	0	>50	**M11A**	1	3
C8	0	>50	**Cu16B**	0	>50	**M11B**	12	1
C9	0	>50				**M12**	1	3
C10	0	>50				**M13**	1	3
C11	2	2				**M14A**	1	3
						M14B	1	3
						M15A	0	>50
						M15B	12	1
						M16A	0	>50

	M16B	12	1
	M17	0	>50

2.1.2 Sampling and sorting

At each site, ants were sampled using a 5 x 4 grid of pitfall traps with 10 m spacing. Traps were partly filled with ethylene glycol as a preservative, and operated for two 48-hr periods, during May and October 2013 at Claravale and Currawarra, and October 2013 and May 2014 at Myrtleville.

Ants from traps were sorted to species, but most could not be named because the great majority of Australian ant species are undescribed. Such species were identified to species group following Andersen (2000), and assigned letter codes (sp. A, etc.) that apply to this study only. The abundance of any species was capped at 50 per trap in order to avoid data distortions caused by extremely high numbers of ants falling into a single trap.

2.1.3 Analysis

We analysed variation in mean species richness among sites in relation to fire frequency class and time since last fire using Permanova, considering each station separately. This was also done for the abundances of the ten most common species at each station. Variation in species composition was explored through non-metric multidimensional scaling (NMDS), using Bray-Curtis dissimilarity based on species presence/absence data. Differences among fire frequency classes and times since fire were tested using ANOSIM.

2.2 Results

A total of 265 ant species from 50 genera were recorded during the study. The richest genera were *Camponotus* (31 species), *Monomorium* (29), *Pheidole* (25), *Melophorus* (24), *Iridomyrmex* (17), *Meranoplus* (16) and *Tetramorium* (15) (Table 2). The most common species were *Iridomyrmex suchieri* (7.9% total ants in traps), *Rhytidoponera metallica* (6.6%), *Notoncus subdentata* (5.0%), *Iridomyrmex ?chasei* (4.8%), *Monomorium* sp. M (*sordidum* gp.; 4.7%), I*ridomyrmex* sp. C (*rufoniger* gp.; 4.2%), *Monomorium* sp. H (*nigrius* gp.; 4.0%), *Iridomyrmex purpureus* (3.8%), *Monomorium* sp. I (*nigrius* gp.; 3.1%), and *Melophorus* sp. L (*aeneovirens* gp.; 2.1%) (Appendix 1).

Site species richness ranged from 30 at CL10 to 57 at CL2B (Appendix 1). It averaged 38.4 at Claravale, 42.7 at Currawarra and at 48.3 Myrtleville, with an overall mean of 43.8. At Claravale and Currawarra, site species richness did not vary with either fire frequency class (P = 0.887 and 0.623 respectively) or time since last fire (P = 0.903 and 0.273 respectively; Figure 3). However at Myrtleville, sites experiencing no fire during the past 30 years had significantly (P = 0.004) lower mean richness than at the other sites (Figure 3).

Considering the ten most common species at each site, in only one case did mean abundance vary significantly with fire frequency class: at Myrtleville, *Melophorus* sp. L (*aeneovirens* gp.) was most abundant at moderate to high fire frequencies (P = 0.007; Figure 4). There were two cases were mean abundance varied significantly with time since fire: at Claravale, *Monomorium* sp. M (*sordidum* gp.) was more common (P = 0.015) at recently (2 yrs) burnt compared with long-unburnt (>50 yrs) sites; and at Currawarra, *Rhytidoponera metallica* was most common (P = 0.01) at recently (1 yr) burnt sites.

NMDS revealed only weak (ANOSIM Global R = 0.066) clustering of sites classified according to fire frequency class (Figure 5a). Notably, sites that had remained unburned for >50 years were dispersed throughout ordination space, and were interspersed with sites that had been burnt on 12 occasions during the past 30 years. There was similarly weak (ANOSIM Global R = 0.181) clustering of sites classified according to time since last fire (Figure 5b)

Table 2. Overview of the ant fauna as recorded in pitfall traps during the study. Figures are numbers of species within genera.

Subfamily Myrmeciinae		**Subfamily Ectatomminae**		**Subfamily Dolichoderinae**	
Myrmecia	1	***Rhytidoponera***	5	*Anonychomyrma*	2
				Arnoldius	1
Subfamily Pseudomyrmecinae		**Subfamily Heteroponinae**		*Dolichoderus*	1
Tetraponera	2	***Heteroponera***	1	*Iridomyrmex*	17
				Leptomyrmex	2
Subfamily Dorylinae		**Subfamily Myrmicinae**		*Ochetellus*	3
Aenictus	2	*Aphaenogaster*	2	*Papyrius*	1
Cerapachys	5	*Cardiocondyla*	2	*Technomyrmex*	1
Sphinctomyrmex	1	*Carebara*	1		
		Colobostruma	2	**Subfamily Formicinae**	
Subfamily Amblyoponinae		*Crematogaster*	6	*Acropyga*	1
Amblyopone	1	*Epopostruma*	1	*Calomyrmex*	2
		Mayriella	1	*Camponotus*	31
Subfamily Ponerinae		*Meranoplus*	16	*Melophorus*	24
Anochetus	1	*Mesostruma*	1	*Notoncus*	7
Brachyponera	1	*Monomorium*	29	*Nylanderia*	3
Hypoponera	3	*Myrmecina*	1	*Opisthopsis*	2
Leptogenys	1	*Pheidole*	25	*Paraparatrechia*	7
Odontomachus	2	*Podomyrma*	3	*Polyrhachis*	9
Pseudoneoponera	1	*Solenopsis*	2	*Prolasius*	1
		Strumigenys	2	*Stigmacros*	8
		Tetramorium	15		

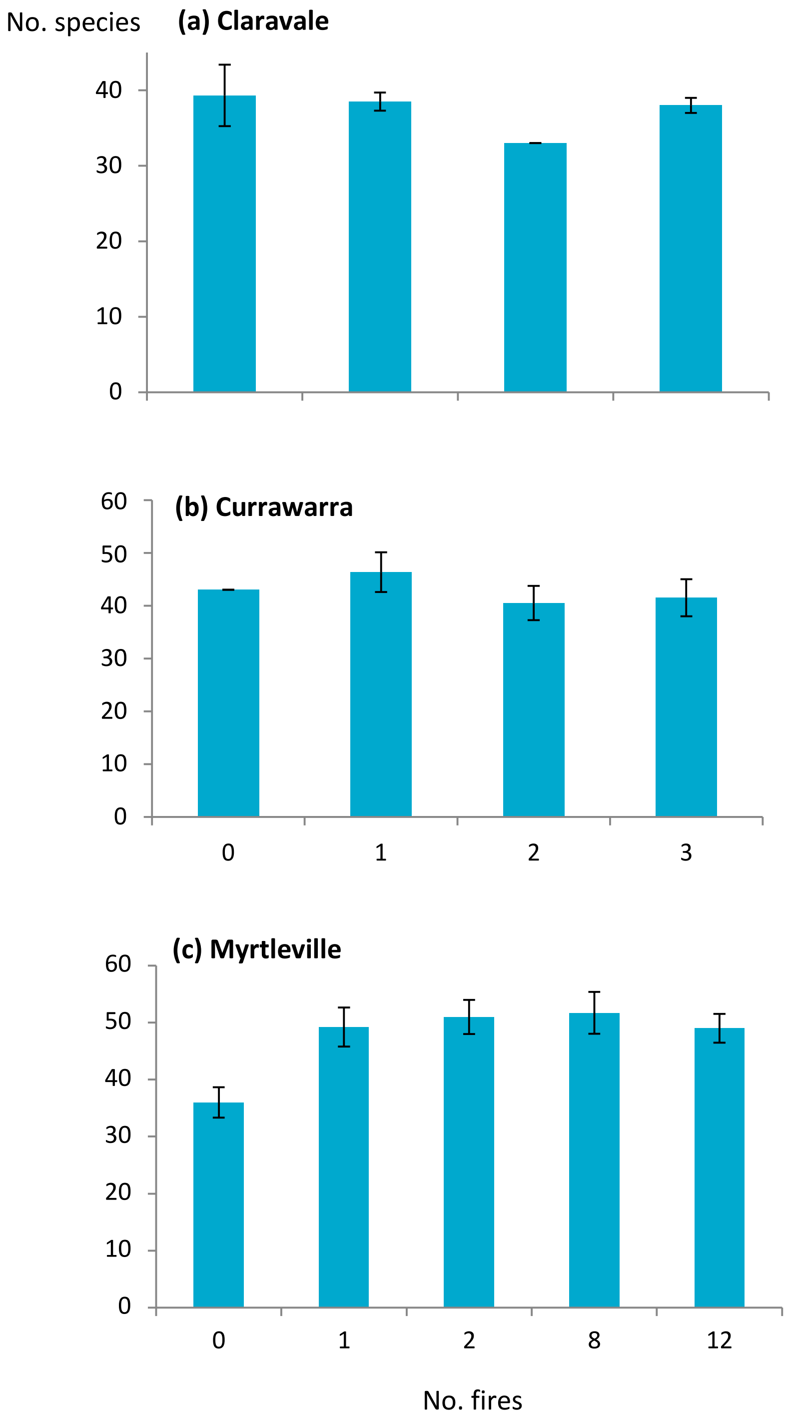


Figure 3. Mean (=/-SE) ant species richness per fire frequency class at each station. There were no significant differences between fire frequency classes at either Claravale or Currawarra (Permanova, P>0,05). At Myrtleville, sites experiencing no fire during the past 30 years had significantly (P = 0.004) lower mean richness than at the others.

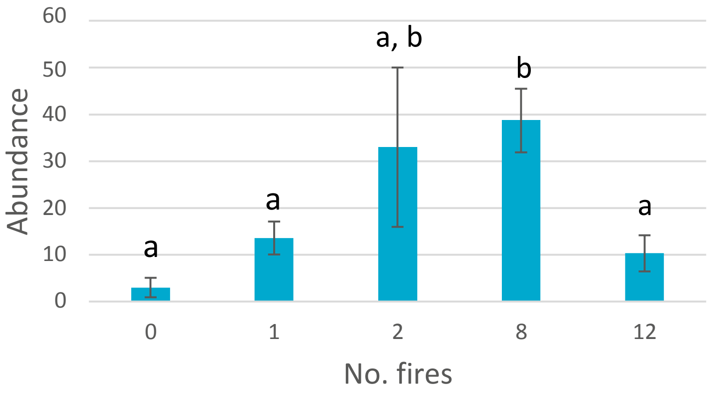


Figure 4. Mean (=/-SE) abundance of *Melophorus* sp. L (*aeneovirens* gp.) in relation to fire frequency class at Myrtleville. Fire frequencyclasses with different letters (a, b) have significantly differences (Permanova, P<0.05) abundances.

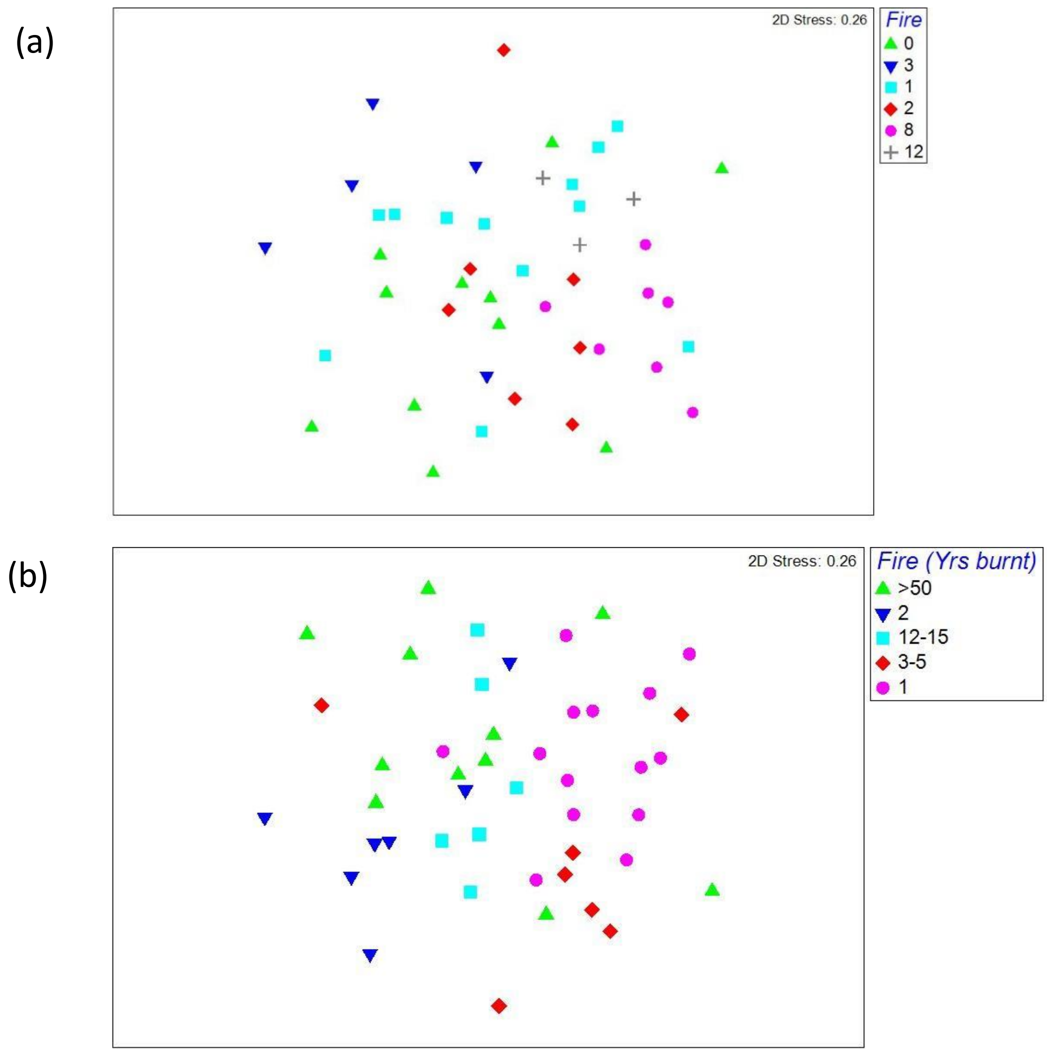


Figure 5. NMDS of study sites classified according to fire frequency class (a; Global R = 0.066) and years since last burnt (b; Global R = 0.181). Analyses are based on Bray-Curtis dissimilarity, using species presence/absence data.

2.3 Discussion

This study represents the first survey of ants in the Maranoa region, and our results show that the Maranoa ant fauna is an extremely diverse one. The fauna is highly noteworthy biogeographically because it has strong representation of taxa characteristic of each of Australia's principle biogeographic realms: Eyrean (arid; e.g. species of *Iridomyrmex*, *Melophorus*, *Meranoplus* and *Tetramorium*); Torresian (tropical; e.g. species of *Anochetus*, *Odontomachus*, *Pseudoneoponera*, *Myrmecina*, *Strumigenys*, *Opisthopsis* and *Calomyrmex*); and Bassian (cool-temperate; e.g. species of *Notoncus*, *Myrmecia*, *Prolasius*, *Stigmacros*, *Epopostruma*, *Colobostruma* and *Mesostruma*). This reflects the location of the Maranoa region at the confluence of these realms. It means that generic diversity is exceptionally high – the 50 genera recorded represent approximately half of Australia's total ant genera (Shattuck 1999), and a far higher proportion of those found outside wet (mostly tropical) forests.

Ant diversity and species composition showed little variation in relation to fire history. Notably, the ant communities of long-unburnt sites were similar to those experiencing high fire frequency. This can be explained by two factors. First, ants suffer very limited mortality during fire because of their below-ground nests, and so the effects of fire on ant communities are primarily indirect, through changes in vegetation structure (Andersen 1988; Andersen et al. 2006). Second, in most cases vegetation structure remained essentially unchanged even in the long-term absence of fire. In the long-term absence of fire, native cypress pine was always present, but typically with low cover, such that the site remained an open grassy woodland (Figure 6). Among our long-unburnt sites, only those at Myrtleville (actually across the fence at Glendonnell) had such a high cover of cypress pine that it transformed vegetation structure (Figure 2). Ant diversity at these sites was substantially lower than at nearby, frequently burnt sites.

We identified three common ant species whose abundances were significantly related to fire history, all of which were most abundant at frequently or recently burnt sites. Two of these - *Melophorus* sp. L (*aeneovirens* gp.) at Myrtleville and *Monomorium* sp. M (*sordidum* gp.) at Claravale, belong to highly thermophilic species groups whose centres of diversity are in the arid zone. They have a particular requirement for open habitats. The third is *Rhytidoponera metallica*, an opportunistic species occurring throughout eastern Australia that is well-known as a disturbance specialist (Hoffmann & Andersen 2003).

Figure 6. Long-unburnt (>50 yrs) sites at Claravale (CL2B; top) and Currawarra (Cu16B; bottom). Native cypress pine (*Callitris columellaris*) is present, but with low cover, such that the vegetation structure of an open grassy woodland is maintained. [Photos: B. Walters]

3 Conclusion

This project has provided extensive information on the effects of different fire regimes on biodiversity in the grassy, eucalypt-dominated woodlands of the coal-seam gas region of south-eastern Queensland. Modelling of results from a controlled fire experiment in the Desert Uplands indicate that eucalypt populations are limited primarily by water availability, and that fire is not a major driver. Changes in tree populations are therefore driven by the dynamics of the fire-sensitive native cypress pine (*Callitris columellaris*), which invades the grassy woodlands in the absence of fire.

Patterns of faunal diversity in relation to historical fire regimes varied among taxa. Very frequent fire (≥3 fires over 15 yrs) was associated with reduced richness of reptiles generally, and of birds in woodland fragments. The latter appeared to be driven primarily by enhanced abundances of highly aggressive and predatory birds, which have been shown in previous studies to drive out many smaller woodland bird species. For small mammals and ants, richness was lowest in long-unburnt habitat with high cover of native cypress pine. These components of the fauna are adapted to open, grassy habitats, and so habitat favourability for them is reduced by increased canopy cover. Notably, we were unable to find any faunal species that was associated with long-unburnt habitat dominated by native cypress pine. This contrasts with biomes in mesic Australia that experience fire at century- rather than decadal scales, where old-growth forest has very high biodiversity value, especially for hollow-nesting fauna (Bradstock et al. 2012).

Taken together, our results show that the biota of grassy woodlands in the CSG region of south-eastern Queensland is highly resilient to a range of moderate fire frequencies (fires occurring approximately every 10-20 yrs), and that it takes either very high fire frequency (i.e. every few years) or a long-term (several decades) absence of fire to cause substantial change in biodiversity. This situation is very different to that for fire-sensitive brigalow vegetation, where increased fire risk due to invasion by the introduced buffel grass has been identified as a priority conservation threat (http://gisera.org.au/publications/tech_reports_papers/Brigalow-Belt-PTM-study.pdf). Our findings indicate that any modest change in regional fire regimes is unlikely to have a significant impact on biodiversity in eucalypt-dominated grassy woodlands. However, it is recommended that an ongoing fire monitoring programme, based on analysis of satellite imagery, be established to ensure that marked changes in regional fire regimes are not occurring as a result of CSG development.

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Appendix 1

	Claravale													
	CL2B	CL3A	CL3B	CL4	CL5A	CL5B	CL6A	CL6B	CL7A	CL7B	CL8	CL9	CL10	CL11
subfamily Myrmeciinae														
Myrmecia dimidiata										2	1		3	
Myrmecia froggatti														
Myrmecia gilberti						1								
Myrmecia picta									1					
Myrmecia varians		1		2					1		1			
subfamily Pseudomyrmecinae														
Tetraponera punctulata														
Tetraponera nr. *punctulata*														
subfamily Dorylinae														
Aenictus prolixus														
Aenictus nr. *turneri*					1									
Cerapachys edentatus									2					
Cerapachys sp. A (*turneri* gp.)														
Cerapachys sp. B (*fervidus* gp.)														
Cerapachys sp. D (*fervidus* gp.)														
Cerapachys sp. E (*brevis* gp.)														
Sphinctomrymex sp. A														
subfamily Ponerinae														
Amblyopone sp. A				1										
Anochetus rectangularis														
Brachyponera lutea	3	4						2		1				
Hypoponera sp. A				1										
Hypoponera sp. B				1										
Hypoponera sp. C														
Leptogenys conigera		1									1	1		
Odontomachus sp. A (*ruficeps* gp.)														
Odontomachus sp. B (*ruficeps* gp.)														
Pseudoneoponera sp. A (*excavata* gp.)	1													
subfamily Ectatomminae														
Rhytidoponera anceps			1	8		1					1		2	
Rhytidoponera cristata				3	1		1			4			1	
Rhytidoponera metallica	51	4	15		21	61		4	17	94	8	2	9	10
Rhytidoponera nr. *rufescens*	12	1				2		1	3		5	3		
Rhytidoponera sp. E (*anceps* gp.)														
subfamily Heteroponinae														
Heteroponera imbellis			1											
subfamily Myrmicinae														
Aphaenogaster barbara			51											
Aphaenogaster barbigula								1		6				
Cardiocondyla atalanta					17									
Cardiocondyla nuda	11	1		4		1					7	1	1	49
Carebara sp. A						1								
Colobostruma elliotti			4					1						
Colobostruma sp. B (*alinodis* gp.)														
Crematogaster sp. 10 (*australis* gp.)	17	54	15		2	1	5	13	5		11	26	2	10
Crematogaster sp. B (*queenslandica* gp.)	2			2				1						
Crematogaster sp. C (*queenslandica* gp.)	50			75			5	27		12		15		
Crematogaster sp. D (*cornigera* gp.)								2				1		
Crematogaster sp. G (*laeviceps* gp.)														
Crematogaster sp. J (*laeviceps gp.*)														
Epopostruma sp. A	1													
Mayriella spinosior		5	5			1	10	2	3	15				
Meranoplus nr. *convexius*														
Meranoplus curvispina														
Meranoplus diversioides				7		1			2					
Meranoplus mjobergi														
Meranoplus orientalis														
Meranoplus pubescens	1			5										
Meranoplus similis							1	1						
Meranoplus sp. B (*dimidiatus* gp.)		15	1		2							1	2	
Meranoplus sp. I (*dimidiatus* gp.)			4											
Meranoplus sp. F (*excavatus* gp.)														
Meranoplus sp. N (*excavatus* gp.)														
Meranoplus sp. Q (*fenestratus* gp.)														
Meranoplus sp. X (*puryi* gp.)								4						
Meranoplus sp. A (Group D)								1						
Meranoplus sp. H (Group D)														
Meranoplus sp. L (Group D)														
Mesostruma turneri									1	5				
Monomorium bicorne	1													
Monomorium ?euryodon						1							9	
Monomorium megalops														
Monomorium rothsteini														15
Monomorium sydneyense				1				8	2	3				
Monomorium sp. A (*carinatum* gp.)	1		6		17	2				1	1		1	11
Monomorium sp. R (*carinatum* gp.)					2									
Monomorium sp. AA (*carinatum* gp.)														
Monomorium sp. AC (*carinatum* gp.)	3													
Monomorium sp. AG (*carinatum* gp.)									1					
Monomorium sp. B (*castaneum* gp.)														1
Monomorium sp. C (*centrale* gp.)	4				3			1				31		1
Monomorium sp. D (*eremopilum* gp.)							1		7					
Monomorium sp. AH (*eremopilum* gp.)								1						
Monomorium sp. BA (*flavipes* gp.)														
Monomorium sp. BD (*flavipes* gp.)														
Monomorium sp. V (*lacunosum* gp.)					1						1			

	CL2B	CL3A	CL3B	CL4	CL5A	CL5B	CL6A	CL6B	CL7A	CL7B	CL8	CL9	CL10	CL11
Monomorium sp. E (*laeve* gp.)	15	13	48	37	10		35	16	9	14	1			2
Monomorium sp. G (*laeve* gp.)							1				1			
Monomorium sp. BC (*laeve* gp.)														
Monomorium sp. H (*nigrius* gp.)	32	50	50	16	8	7	82	32	50	6		2	12	
Monomorium sp. I (*nigrius* gp.)		10	37		6	3	12	7	15	50			41	5
Monomorium sp. J (*nigrius* gp.)					7								1	
Monomorium sp. P (*nigrius* gp.)	5									3			2	9
Monomorium sp. Q (*nigrius* gp.)														
Monomorium sp. L (*rothsteini* gp.)														4
Monomorium sp. M (*sordidum* gp.)	5	100	47	100	3		72	13	100	63	2	1	1	51
Monomorium sp. MM (*sordidum* gp.)														
Monomorium sp. AF (*sordidum* gp.)		10	1											
Myrmecina australis						1								
Pheidole sp. F (*ampla* gp.)											19	11	12	
Pheidole sp. K (*ampla* gp.)						1								
Pheidole sp. L (*ampla* gp.)					9	21								1
Pheidole sp. BD (*ampla* gp.)												1		
Pheidole sp. X (*mjobergi* gp.)	6	3				1	2	5	3	8		3	3	1
Pheidole sp. G (*mjobergi* gp.)														9
Pheidole sp. H (*mjobergi* gp.)					15									24
Pheidole sp. O (*pyriformis* gp.)			1											
Pheidole sp. P (*pyriformis* gp.)					4									
Pheidole sp. W (*pyriformis* gp.)		17	1	10										
Pheidole sp. E (*variabilis* gp.)				4						4				
Pheidole sp. I (*variabilis* gp.)	9				6	17								17
Pheidole sp. J (Group B)	2										13			
Pheidole sp. BC (Group B)														
Pheidole sp. B (Group C)		2			2		10	7	9	2		1		
Pheidole sp. Y (Group C)		1												
Pheidole sp. BG (Group C)					5									
Pheidole sp. A (Group E)	9	20	21	29	9	7	32	7						
Pheidole sp. R (Group E)	3		6					10	30	12	2	3	8	5
Pheidole sp. S (Group E)														
Pheidole sp. U (Group E)							14							
Pheidole sp. UA (Group E)														
Pheidole sp. BBA (Group E)														
Pheidole sp. BBB (Group E)			16											
Pheidole sp. N (Group F)					2							1		
Podomyrma adelaidae														
Podomyrma elongata														
Podomyrma inermis														
Solenopsis sp. A	8	56	31	22			22	21	28	14		1	45	8
Solenopsis sp. B														
Strumigenys sp. A														
Strumigenys sp. B		2	1											
Tetramorium sp. P (*impressum* gp.)														
Tetramorium sp. A (*striolatum* gp.)			6	1							2			
Tetramorium sp. B (*striolatum* gp.)				3		1								
Tetramorium sp. C (*striolatum* gp.)			2								1			
Tetramorium sp. CC (*striolatum* gp.)														
Tetramorium sp. D (*striolatum* gp.)														
Tetramorium sp. F (*striolatum* gp.)		19												
Tetramorium sp. G (*striolatum* gp.)								1						
Tetramorium sp. H (*striolatum* gp.)						1								
Tetramorium sp. I (*striolatum* gp.)														
Tetramorium sp. J (*striolatum* gp.)														
Tetramorium sp. K (*striolatum* gp.)														
Tetramorium sp. L (*striolatum* gp.)														
Tetramorium sp. N (*striolatum* gp.)														
Tetramorium sp. S (*striolatum* gp.)														
subfamily Dolichoderinae														
Anonychomyrma sp. A (*itinerans* gp.)														
Anonychomyrma sp. B (*biconvexa* gp.)														
Arnoldius sp. A														
Dolichoderus scrobiculatus			3			5	1			2				
Iridomyrmex brunneus	6			4		4	3	6	8		2	2		
Iridomyrmex ?chasei	50	4		100	54		50	50	19			100		
Iridomyrmex discors										4				
Iridomyrmex nr. *dromus*		1												
Iridomyrmex ?hartmeyeri													3	
Iridomyrmex purpureus	14				13	1				2	65	50		2
Iridomyrmex septentrionalis	100													
Iridomyrmex suchieri	54				60	100	50	51		5	100	17		100
Iridomyrmex suchieroides	7												7	
Iridomyrmex nr. *suchieroides*														
Iridomyrmex sp. A (*anceps* gp.)	3											4		
Iridomyrmex sp. G (*bicknelli* gp.)	2											1		
Iridomyrmex sp. B (*mjobergi* gp.)	1													
Iridomyrmex sp. D (*mjobergi* gp.)									9	1				
Iridomyrmex sp. J (*mjobergi* gp.)													1	
Iridomyrmex sp. P (*mjobergi* gp.)				2										
Iridomyrmex sp. C (*rufoniger* gp.)		100	100	50					50	8	50			
Leptomyrmex rufipes														
Leptomyrmex varians														
Ochetellus clarithorax	1	1	1					11		4				
Ochetellus sp. B					1	2		1						
Ochetellus sp. C														
Papyrius sp. A														
Tapinoma sp. A (*minutum* gp.)	4			2			1		2	2		1	1	
Tapinoma sp. B (*minutum* gp.)			35				2	6	8	35			1	
Tapinoma sp. C (*minutum* gp.)		4					9	11		2				
Technomyrmex antoni	23		2		25		1	4		5		9		3

	CL2B	CL3A	CL3B	CL4	CL5A	CL5B	CL6A	CL6B	CL7A	CL7B	CL8	CL9	CL10	CL11
subfamily Formicinae														
Acropyga sp. A									1					
Calomyrmex albopilosus	3													
Calomyrmex similis	3			1										
Camponotus aeneopilosus	1				3	3	3	2			1		1	2
Camponotus nr. *consobrinus*														
Camponotus dromas							1		1					
Camponotus ephippium														
Camponotus extensus														
Camponotus loweryi													2	
Camponotus nr. *nigriceps*	8	2	2	2		1		2	1	1			1	
Camponotus suffusus														
Camponotus nr. *vitreus*														
Camponotus whitei														
Camponotus sp. B (*claripes* gp.)														
Camponotus sp. F (*claripes* gp.)								1	1					
Camponotus sp. H (*claripes* gp.)	2				1									
Camponotus sp. R (*claripes* gp.)				1										
Camponotus sp. W (*claripes* gp.)	1		12								2			
Camponotus sp. BA (*claripes* gp.)														
Camponotus sp. BC (*claripes* gp.)														
Camponotus sp. CA (*claripes* gp.)														
Camponotus sp. CB (*claripes* gp.)														
Camponotus sp. E (*discors* gp.)														
Camponotus sp. BK (*discors* gp.)														
Camponotus sp. K (*ephippium* gp.)			3											
Camponotus sp. A (*minimus* gp.)											1			
Camponotus sp. BF (*nigroaeneus* gp.)														
Camponotus sp. BL (*nigroaeneus* gp.)														
Camponotus sp. C (*novaehollandiae* gp.)														
Camponotus sp. O (*novaehollandiae* gp.)														
Camponotus sp. D (*rubiginosus* gp.)														
Camponotus sp. G (*rubiginosus* gp.)	1		1						2					
Camponotus sp. L (*subnitidus* gp.)														
Camponotus sp. X (*subnitidus* gp.)														
Melophorus sp. L (*aeneovirens* gp.)	1			1	1		4		6	2	2			1
Melophorus sp. BI (*aeneovirens* gp.)														
Melophorus sp. B (*bruneus* gp.)							1							
Melophorus sp. W (*bruneus* gp.)														
Melophorus sp. R (*fieldi* gp.)														
Melophorus sp. BH (*fieldi* gp.)														
Melophorus sp. A (*froggatti* gp.)	6	1	4		3		1					2		1
Melophorus sp. H (*froggatti* gp.)		2		3				2	1		2			2
Melophorus sp. C (*mjobergi* gp.)				4							1			
Melophorus sp. F (*mjobergi* gp.)	6		1		1	2	1					2		1
Melophorus sp. I (*mjobergi* gp.)					4					1				
Melophorus sp. K (*mjobergi* gp.)	5			3	1						1			7
Melophorus sp. AE (*mjobergi* gp.)														
Melophorus sp. AO (*mjobergi* gp.)									1	2				
Melophorus sp. BG (*mjobergi* gp.)														
Melophorus sp. E (*pillipes* gp.)											2	3		
Melophorus sp. AH (*pillipes* gp.)													1	
Melophorus sp. P (*turneri* gp.)														
Melophorus sp. T (*turneri* gp.)	1													
Melophorus sp. O (*wheeleri* gp.)														
Melophorus sp. S (Group B)														4
Melophorus sp. AT (Group C)														
Melophorus sp. AM (Group J)														
Melophorus sp. CA (Group M)														
Notoncus subdentata	80	27		81	15	3	12	1	34	1	13	5	8	10
Notoncus sp. C (*ectatommoides* gp.)														
Notoncus sp. D (*ectatommoides* gp.)														
Notoncus sp. E (*enormis* gp.)			86				14		1					
Notoncus sp. F (*enormis* gp.)	16	3		21		3	6	11		2				
Notoncus sp. G (*enormis* gp.)	13				5						9	2	15	
Notoncus sp. I (*giberti* gp.)														
Nylanderia rosae	3			50	1	4		1	3	1				3
Nylanderia sp. A (*vaga* gp.)			3	51	2		1		2		1	11		2
Nylanderia sp. C (*obscura* gp.)		100			5	4								1
Opisthopsis pictus	3			1							1			
Opisthopsis rufithorax	1					1								
Paraparatrechina sp. A (*minutula* gp.)							1	2		6		1		
Paraparatrechina sp. B (*minutula* gp.)	3								5	6	1			
Paraparatrechina sp. D (*minutula* gp.)		8	24	7				1						
Paraparatrechina sp. E (*minutula* gp.)														
Paraparatrechina sp. F (*minutula* gp.)														
Paraparatrechina sp. G (*minutula* gp.)	3													
Paraparatrechina sp. H (*minutula* gp.)														
Polyrhachis conciliata														
Polyrhachis hookeri						1								
Polyrhachis insularis														
Polyrhachis lata														
Polyrhachis lydiae														
Polyrhachis micans								1						
Polyrhachis prometheus														
Polyrhachis nr. *senilis*														
Polyrhachis sp. K (*schwiedlandi* gp.)														
Prolasius sp. A (*reticulata* gp.)														
Stigmacros aciculata	1													
Stigmacros aemula			1											
Stigmacros nr. *inermis*														
Stigmacros intacta		13										1		
Stigmacros pilosella		1											3	
Stigmacros pusilla														
Stigmacros sp. A (*flavinodis* gp.)								1						
Stigmacros sp. N (*pusilla* gp.)														
Total	678	656	649	716	348	267	467	354	444	411	332	316	199	372
No. species	57	36	39	39	40	35	35	45	39	40	35	34	30	33

Appendix 1

	Currawarra										
	CU6	CU8	CU9A	CU9B	CU10	CU12	CU13	CU14	CU15	CU16A	CU16B
subfamily Myrmeciinae											
Myrmecia dimidiata											
Myrmecia froggatti											
Myrmecia gilberti	1								1		
Myrmecia picta											
Myrmecia varians											
subfamily Pseudomyrmecinae											
Tetraponera punctulata											
Tetraponera nr. *punctulata*											
subfamily Dorylinae											
Aenictus prolixus											
Aenictus nr. *turneri*											1
Cerapachys edentatus			1								
Cerapachys sp. A (*turneri* gp.)										3	
Cerapachys sp. B (*fervidus* gp.)											
Cerapachys sp. D (*fervidus* gp.)											
Cerapachys sp. E (*brevis* gp.)			1								
Sphinctomrymex sp. A											
subfamily Ponerinae											
Amblyopone sp. A											
Anochetus rectangularis											
Brachyponera lutea	2	2	3	1	2		5	1	2		1
Hypoponera sp. A											
Hypoponera sp. B											
Hypoponera sp. C											
Leptogenys conigera	1		1		1	2		3			1
Odontomachus sp. A (*ruficeps* gp.)						1	1				
Odontomachus sp. B (*ruficeps* gp.)											
Pseudoneoponera sp. A (*excavata* gp.)											
subfamily Ectatomminae											
Rhytidoponera anceps								4			
Rhytidoponera cristata	1		5	2	2		13	9	1		
Rhytidoponera metallica	41	54	50	79	88	19	30	61	94	39	36
Rhytidoponera nr. *rufescens*				7	10	9	9	2	1	1	7
Rhytidoponera sp. E (*anceps* gp.)	3										
subfamily Heteroponinae											
Heteroponera imbellis											
subfamily Myrmicinae											
Aphaenogaster barbara											
Aphaenogaster barbigula											
Cardiocondyla atalanta		28									
Cardiocondyla nuda	2	13	10	2	3	41			3	8	3
Carebara sp. A											
Colobostruma elliotti											
Colobostruma sp. B (*alinodis* gp.)											
Crematogaster sp. 10 (*australis* gp.)	22	57	15	6			22	26	29		18
Crematogaster sp. B (*queenslandica* gp.)				1	1						
Crematogaster sp. C (*queenslandica* gp.)						4					
Crematogaster sp. D (*cornigera* gp.)	48										
Crematogaster sp. G (*laeviceps* gp.)											
Crematogaster sp. J (*laeviceps gp.*)											
Epopostruma sp. A											
Mayriella spinosior						2					
Meranoplus nr. *convexius*											
Meranoplus curvispina											
Meranoplus diversioides			5			1					
Meranoplus mjobergi											
Meranoplus orientalis											
Meranoplus pubescens											
Meranoplus similis											
Meranoplus sp. B (*dimidiatus* gp.)		1		1							
Meranoplus sp. I (*dimidiatus* gp.)											
Meranoplus sp. F (*excavatus* gp.)											
Meranoplus sp. N (*excavatus* gp.)											
Meranoplus sp. Q (*fenestratus* gp.)											
Meranoplus sp. X (*puryi* gp.)									1		
Meranoplus sp. A (Group D)											
Meranoplus sp. H (Group D)					1						
Meranoplus sp. L (Group D)											
Mesostruma turneri					10						
Monomorium bicorne											
Monomorium ?euryodon			50						1		
Monomorium megalops		27									
Monomorium rothsteini			2				3				
Monomorium sydneyense										3	
Monomorium sp. A (*carinatum* gp.)		10									
Monomorium sp. R (*carinatum* gp.)		7									
Monomorium sp. AA (*carinatum* gp.)					1						
Monomorium sp. AC (*carinatum* gp.)											
Monomorium sp. AG (*carinatum* gp.)			4						29		
Monomorium sp. B (*castaneum* gp.)											
Monomorium sp. C (*centrale* gp.)		1	1						3		
Monomorium sp. D (*eremopilum* gp.)											
Monomorium sp. AH (*eremopilum* gp.)											
Monomorium sp. BA (*flavipes* gp.)											
Monomorium sp. BD (*flavipes* gp.)											
Monomorium sp. V (*lacunosum* gp.)											

	CU6	CU8	CU9A	CU9B	CU10	CU12	CU13	CU14	CU15	CU16A	CU16B
Monomorium sp. E (*laeve* gp.)			16	23				7	8	18	3
Monomorium sp. G (*laeve* gp.)											
Monomorium sp. BC (*laeve* gp.)			17		4						
Monomorium sp. H (*nigrius* gp.)	5	2	54			6		9	50	46	25
Monomorium sp. I (*nigrius* gp.)	3		8	5		1	2	12	16	16	10
Monomorium sp. J (*nigrius* gp.)		2	50	50	2		4		5		
Monomorium sp. P (*nigrius* gp.)			31								
Monomorium sp. Q (*nigrius* gp.)											
Monomorium sp. L (*rothsteini* gp.)							7				
Monomorium sp. M (*sordidum* gp.)	23	2	6	14	68	83	1	51	89	55	35
Monomorium sp. MM (*sordidum* gp.)											
Monomorium sp. AF (*sordidum* gp.)											
Myrmecina australis											
Pheidole sp. F (*ampla* gp.)											
Pheidole sp. K (*ampla* gp.)											
Pheidole sp. L (*ampla* gp.)											
Pheidole sp. BD (*ampla* gp.)											
Pheidole sp. X (*mjobergi* gp.)	3	20	3	13	3	1	2			2	11
Pheidole sp. G (*mjobergi* gp.)											
Pheidole sp. H (*mjobergi* gp.)				4						1	
Pheidole sp. O (*pyriformis* gp.)											
Pheidole sp. P (*pyriformis* gp.)											
Pheidole sp. W (*pyriformis* gp.)	1		1					3			
Pheidole sp. E (*variabilis* gp.)											
Pheidole sp. I (*variabilis* gp.)		1			18	2		9		6	7
Pheidole sp. J (Group B)		5					3	6			
Pheidole sp. BC (Group B)											
Pheidole sp. B (Group C)				2						15	3
Pheidole sp. Y (Group C)											
Pheidole sp. BG (Group C)											
Pheidole sp. A (Group E)	5	3	3	1	36	34		8	15	12	6
Pheidole sp. R (Group E)		1	1			3			28		1
Pheidole sp. S (Group E)	1										
Pheidole sp. U (Group E)	1			2							
Pheidole sp. UA (Group E)					4						
Pheidole sp. BBA (Group E)		1									
Pheidole sp. BBB (Group E)											
Pheidole sp. N (Group F)											
Podomyrma adelaidae	1		1								
Podomyrma elongata											
Podomyrma inermis											
Solenopsis sp. A	6	3	2	7	4	4	1	1	7	20	10
Solenopsis sp. B									3		
Strumigenys sp. A											
Strumigenys sp. B											
Tetramorium sp. P (*impressum* gp.)											
Tetramorium sp. A (*striolatum* gp.)	2							1	3		
Tetramorium sp. B (*striolatum* gp.)	31	3	1		3	3	6	3	1	1	
Tetramorium sp. C (*striolatum* gp.)					1						
Tetramorium sp. CC (*striolatum* gp.)				1			2				
Tetramorium sp. D (*striolatum* gp.)											
Tetramorium sp. F (*striolatum* gp.)											
Tetramorium sp. G (*striolatum* gp.)			1			1					
Tetramorium sp. H (*striolatum* gp.)										1	
Tetramorium sp. I (*striolatum* gp.)											
Tetramorium sp. J (*striolatum* gp.)											
Tetramorium sp. K (*striolatum* gp.)											
Tetramorium sp. L (*striolatum* gp.)											
Tetramorium sp. N (*striolatum* gp.)											
Tetramorium sp. S (*striolatum* gp.)											
subfamily Dolichoderinae											
Anonychomyrma sp. A (*itinerans* gp.)											
Anonychomyrma sp. B (*biconvexa* gp.)											
Arnoldius sp. A											
Dolichoderus scrobiculatus			4	6	1	2		2	2		
Iridomyrmex brunneus	12	26	29	30		2	50	20	4	5	4
Iridomyrmex ?chasei	19		35	100	51		100		49	25	8
Iridomyrmex discors			6		27						
Iridomyrmex nr. *dromus*	2			3	1						
Iridomyrmex ?hartmeyeri											
Iridomyrmex purpureus			53			2			52		
Iridomyrmex septentrionalis						50					
Iridomyrmex suchieri	64	57	50			50	50	2	6	55	
Iridomyrmex suchieroides											
Iridomyrmex nr. *suchieroides*							50				
Iridomyrmex sp. A (*anceps* gp.)						14	50				1
Iridomyrmex sp. G (*bicknelli* gp.)			1								
Iridomyrmex sp. B (*mjobergi* gp.)											50
Iridomyrmex sp. D (*mjobergi* gp.)		1	2							25	14
Iridomyrmex sp. J (*mjobergi* gp.)											
Iridomyrmex sp. P (*mjobergi* gp.)											
Iridomyrmex sp. C (*rufoniger* gp.)		50				100	1			100	50
Leptomyrmex rufipes											
Leptomyrmex varians			1								
Ochetellus clarithorax	1				1					27	
Ochetellus sp. B										5	
Ochetellus sp. C	4										
Papyrius sp. A											
Tapinoma sp. A (*minutum* gp.)	1		1	5				4	11	6	2
Tapinoma sp. B (*minutum* gp.)		3							4	7	
Tapinoma sp. C (*minutum* gp.)				1		1	12	1	1		2
Technomyrmex antoni		6		54		7		22	24	15	2

	CU6	CU8	CU9A	CU9B	CU10	CU12	CU13	CU14	CU15	CU16A	CU16B
subfamily Formicinae											
Acropyga sp. A											
Calomyrmex albopilosus	1		1	3					18	3	3
Calomyrmex similis											4
Camponotus aeneopilosus		2									
Camponotus nr. *consobrinus*				1		7				1	
Camponotus dromas								1			
Camponotus ephippium									1		3
Camponotus extensus											
Camponotus loweryi		4	1		1		2		31	4	2
Camponotus nr. *nigriceps*			1	1	1			6	2	2	
Camponotus suffusus											2
Camponotus nr. *vitreus*											
Camponotus whitei									1		1
Camponotus sp. B (*claripes* gp.)									2		
Camponotus sp. F (*claripes* gp.)				1			1		1		
Camponotus sp. H (*claripes* gp.)		1							3		
Camponotus sp. R (*claripes* gp.)											
Camponotus sp. W (*claripes* gp.)											
Camponotus sp. BA (*claripes* gp.)											
Camponotus sp. BC (*claripes* gp.)											
Camponotus sp. CA (*claripes* gp.)											
Camponotus sp. CB (*claripes* gp.)											
Camponotus sp. E (*discors* gp.)			1				2				
Camponotus sp. BK (*discors* gp.)				1							
Camponotus sp. K (*ephippium* gp.)											
Camponotus sp. A (*minimus* gp.)											
Camponotus sp. BF (*nigroaeneus* gp.)											
Camponotus sp. BL (*nigroaeneus* gp.)								1	1		
Camponotus sp. C (*novaehollandiae* gp.)							1				
Camponotus sp. O (*novaehollandiae* gp.)											
Camponotus sp. D (*rubiginosus* gp.)								1			
Camponotus sp. G (*rubiginosus* gp.)				1					5	1	
Camponotus sp. L (*subnitidus* gp.)											
Camponotus sp. X (*subnitidus* gp.)											
Melophorus sp. L (*aeneovirens* gp.)	3		2	3		1	12	2	6	7	1
Melophorus sp. BI (*aeneovirens* gp.)											
Melophorus sp. B (*bruneus* gp.)							1				
Melophorus sp. W (*bruneus* gp.)											
Melophorus sp. R (*fieldi* gp.)							2				
Melophorus sp. BH (*fieldi* gp.)											
Melophorus sp. A (*froggatti* gp.)		1				5	1		1	5	1
Melophorus sp. H (*froggatti* gp.)	3	1		1		3				1	
Melophorus sp. C (*mjobergi* gp.)				1							
Melophorus sp. F (*mjobergi* gp.)			8				1		1	1	4
Melophorus sp. I (*mjobergi* gp.)											
Melophorus sp. K (*mjobergi* gp.)	1	6	3	1			2			1	
Melophorus sp. AE (*mjobergi* gp.)											
Melophorus sp. AO (*mjobergi* gp.)							5	1	4		
Melophorus sp. BG (*mjobergi* gp.)											
Melophorus sp. E (*pillipes* gp.)		3									1
Melophorus sp. AH (*pillipes* gp.)		1	1	22		1		51			
Melophorus sp. P (*turneri* gp.)											1
Melophorus sp. T (*turneri* gp.)											
Melophorus sp. O (*wheeleri* gp.)											2
Melophorus sp. S (Group B)											
Melophorus sp. AT (Group C)		1									
Melophorus sp. AM (Group J)											
Melophorus sp. CA (Group M)											
Notoncus subdentata	82	6	100	59	9	21	8	59	46	100	54
Notoncus sp. C (*ectatommoides* gp.)	2					4					
Notoncus sp. D (*ectatommoides* gp.)						1					
Notoncus sp. E (*enormis* gp.)		3		6							
Notoncus sp. F (*enormis* gp.)				2				1	22	1	
Notoncus sp. G (*enormis* gp.)		1						3		5	
Notoncus sp. I (*giberti* gp.)					1						
Nylanderia rosae	78	1		55	5	8		12			1
Nylanderia sp. A (*vaga* gp.)		1	1					11			1
Nylanderia sp. C (*obscura* gp.)	31										
Opisthopsis pictus		1	1		1				1	1	
Opisthopsis rufithorax		1		1		1			4		
Paraparatrechina sp. A (*minutula* gp.)			13	4				6			8
Paraparatrechina sp. B (*minutula* gp.)				3	12			16			
Paraparatrechina sp. D (*minutula* gp.)											
Paraparatrechina sp. E (*minutula* gp.)						1					
Paraparatrechina sp. F (*minutula* gp.)										2	
Paraparatrechina sp. G (*minutula* gp.)											
Paraparatrechina sp. H (*minutula* gp.)											
Polyrhachis conciliata											
Polyrhachis hookeri											
Polyrhachis insularis							1				
Polyrhachis lata					1						
Polyrhachis lydiae		1									
Polyrhachis micans											
Polyrhachis prometheus					2			1			
Polyrhachis nr. *senilis*	1	1	2	2			1				2
Polyrhachis sp. K (*schwiedlandi* gp.)	1										
Prolasius sp. A (*reticulata* gp.)				1							
Stigmacros aciculata											
Stigmacros aemula									1		
Stigmacros nr. *inermis*											
Stigmacros intacta					1						
Stigmacros pilosella								2		1	
Stigmacros pusilla			1								
Stigmacros sp. A (*flavinodis* gp.)			1		2	1					
Stigmacros sp. N (*pusilla* gp.)											
Total	509	422	662	589	379	499	464	441	694	653	402
No. species	38	45	53	46	36	39	37	40	50	43	43

Appendix 1

	Myrtleville																					TOTAL
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M11A	M11B	M12	M13	M14A	M14B	M15A	M15B	M16A	M16B	M17		
subfamily Myrmeciinae																						
Myrmecia dimidiata																						6
Myrmecia froggatti			1																			1
Myrmecia gilberti																	1					4
Myrmecia picta																						1
Myrmecia varians																						5
subfamily Pseudomyrmecinae																						
Tetraponera punctulata		1						1									1					3
Tetraponera nr. *punctulata*		1																				1
subfamily Dorylinae																						
Aenictus prolixus									3													3
Aenictus nr. *turneri*									4													6
Cerapachys edentatus																						3
Cerapachys sp. A (*turneri* gp.)																						3
Cerapachys sp. B (*fervidus* gp.)						1																1
Cerapachys sp. D (*fervidus* gp.)															1							1
Cerapachys sp. E (*brevis* gp.)																				1		2
Sphinctomrymex sp. A																				3		3
subfamily Ponerinae																						
Amblyopone sp. A																						1
Anochetus rectangularis																	1					1
Brachyponera lutea	2		1		2	2		1				7		1					1			46
Hypoponera sp. A						1																2
Hypoponera sp. B																						1
Hypoponera sp. C																1						1
Leptogenys conigera									2	1	1		1		2		1	2	1			23
Odontomachus sp. A (*ruficeps* gp.)			1															1				4
Odontomachus sp. B (*ruficeps* gp.)	2	2				2	4	1				1	1									13
Pseudoneoponera sp. A (*excavata* gp.)																						1
subfamily Ectatomminae																						
Rhytidoponera anceps																						17
Rhytidoponera cristata		1	2			34	7	1	1	2					2		2		9	3		107
Rhytidoponera metallica	35	8	33	19	36	18	24	7	55	49	63	33	3	93	22	30	70	30	41	25		1581
Rhytidoponera nr. *rufescens*	6	8	4	8	15	18		10	32	1	4	10			2	1			13	14		219
Rhytidoponera sp. E (*anceps* gp.)																						3
subfamily Heteroponinae																						
Heteroponera imbellis																						1
subfamily Myrmicinae																						
Aphaenogaster barbara			1		1	12	1		7	7	8	10		2	6	1	5	4	3			119
Aphaenogaster barbigula							4	1						6					4			22
Cardiocondyla atalanta															1							46
Cardiocondyla nuda	9		1	2	1	7		3	5	9	21	4		6			29	1		5		263
Carebara sp. A			1																			2
Colobostruma elliotti														1								6
Colobostruma sp. B (*alinodis* gp.)											1											1
Crematogaster sp. 10 (*australis* gp.)	50	30		9					5		9			1	7					15		482
Crematogaster sp. B (*queenslandica* gp.)	6		26		2					1				1						1		44
Crematogaster sp. C (*queenslandica* gp.)					2				27													217
Crematogaster sp. D (*cornigera* gp.)	1				1								1									54
Crematogaster sp. G (*laeviceps* gp.)																			1			1
Crematogaster sp. J (*laeviceps gp.*)																1						1
Epopostruma sp. A																						1
Mayriella spinosior																						43
Meranoplus nr. *convexius*											5											5
Meranoplus curvispina									1	1		2		1			1			2		8
Meranoplus diversioides			3		1	4						1					1					26
Meranoplus mjobergi										1												1
Meranoplus orientalis			2						20													22
Meranoplus pubescens						51				13		1							21			92
Meranoplus similis																						2
Meranoplus sp. B (*dimidiatus* gp.)																						23
Meranoplus sp. I (*dimidiatus* gp.)																						4
Meranoplus sp. F (*excavatus* gp.)			1									1										2
Meranoplus sp. N (*excavatus* gp.)										1												1
Meranoplus sp. Q (*fenestratus* gp.)										1												1
Meranoplus sp. X (*puryi* gp.)					3									1								9
Meranoplus sp. A (Group D)										5												6
Meranoplus sp. H (Group D)						1					4	1			4							11
Meranoplus sp. L (Group D)															1							1
Mesostruma turneri																						16
Monomorium bicorne			1						2				9									13
Monomorium ?euryodon			3																			64
Monomorium megalops																						27
Monomorium rothsteini	30		1	25	80		2	24	26		1		53			8						270
Monomorium sydneyense																						17
Monomorium sp. A (*carinatum* gp.)	3	1				1													3			58
Monomorium sp. R (*carinatum* gp.)		2	2	8		50																71
Monomorium sp. AA (*carinatum* gp.)									2	3					1			5				12
Monomorium sp. AC (*carinatum* gp.)										1												4
Monomorium sp. AG (*carinatum* gp.)																						34
Monomorium sp. B (*castaneum* gp.)		8				2		9					1									21
Monomorium sp. C (*centrale* gp.)		1	9	28			36	1	16	8	12		6		2		11					175
Monomorium sp. D (*eremopilum* gp.)																						8
Monomorium sp. AH (*eremopilum* gp.)				51		50			54			1										157
Monomorium sp. BA (*flavipes* gp.)																						0
Monomorium sp. BD (*flavipes* gp.)																				1		1
Monomorium sp. V (*lacunosum* gp.)																						2

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M11A	M11B	M12	M13	M14A	M14B	M15A	M15B	M16A	M16B	M17		
Monomorium sp. E (*laeve* gp.)		17	6	1	2	61	1		3	3	51	1	12	2	1				7	4		447
Monomorium sp. G (*laeve* gp.)																						2
Monomorium sp. BC (*laeve* gp.)			1											3				8		3		36
Monomorium sp. H (*nigrius* gp.)	20	2	1		9		37	42	5		50	13	14	50	15	13	50	50		50		965
Monomorium sp. I (*nigrius* gp.)	19		3	5	24	11		19	37	21	66	2		100	45	27	13	53	23	9		736
Monomorium sp. J (*nigrius* gp.)					50	19			12	85	10	12		12	47			4		12		384
Monomorium sp. P (*nigrius* gp.)									35										50			135
Monomorium sp. Q (*nigrius* gp.)	1	6										50										57
Monomorium sp. L (*rothsteini* gp.)																						11
Monomorium sp. M (*sordidum* gp.)	8	1		2	16	1	78			4	1			13	6	1		21	3	1		1141
Monomorium sp. MM (*sordidum* gp.)												3										3
Monomorium sp. AF (*sordidum* gp.)																						11
Myrmecina australis																						1
Pheidole sp. F (*ampla* gp.)																						42
Pheidole sp. K (*ampla* gp.)																						1
Pheidole sp. L (*ampla* gp.)																						31
Pheidole sp. BD (*ampla* gp.)																						1
Pheidole sp. X (*mjobergi* gp.)	29	4		33			30	5	7	1	53		39	2	4	35	100	8	12			455
Pheidole sp. G (*mjobergi* gp.)																						9
Pheidole sp. H (*mjobergi* gp.)																	15					59
Pheidole sp. O (*pyriformis* gp.)						8																9
Pheidole sp. P (*pyriformis* gp.)													1									5
Pheidole sp. W (*pyriformis* gp.)	1		2							1		2						18	1			58
Pheidole sp. E (*variabilis* gp.)																						8
Pheidole sp. I (*variabilis* gp.)	43	5		11	18	9	49	13		28	15	6	11			10	9	17				336
Pheidole sp. J (Group B)		2	2		7	6				1		8			13					2		70
Pheidole sp. BC (Group B)										13									1			14
Pheidole sp. B (Group C)		3										23							5			84
Pheidole sp. Y (Group C)																		1				2
Pheidole sp. BG (Group C)																						5
Pheidole sp. A (Group E)	24		1		8	3	7			25	30	8	1		1		16	6	6	1		394
Pheidole sp. R (Group E)			1											50	4	10		2				180
Pheidole sp. S (Group E)															1							2
Pheidole sp. U (Group E)			1					4		4		3			5			33	2			69
Pheidole sp. UA (Group E)																						4
Pheidole sp. BBA (Group E)																						1
Pheidole sp. BBB (Group E)																						16
Pheidole sp. N (Group F)																						3
Podomyrma adelaidae																						2
Podomyrma elongata	1			1																		2
Podomyrma inermis							1															1
Solenopsis sp. A		3	2		12	9	3	1	7	4	11	3	1	2	8	7	51	1	15	3		464
Solenopsis sp. B																		8				11
Strumigenys sp. A														1								1
Strumigenys sp. B																						3
Tetramorium sp. P (*impressum* gp.)	1		1																			2
Tetramorium sp. A (*striolatum* gp.)																	1					16
Tetramorium sp. B (*striolatum* gp.)	2						5									1	3					67
Tetramorium sp. C (*striolatum* gp.)	5				5	3	2						3							26		48
Tetramorium sp. CC (*striolatum* gp.)	1		1	5		2	1										1			2		16
Tetramorium sp. D (*striolatum* gp.)		5								8							1					14
Tetramorium sp. F (*striolatum* gp.)							1															20
Tetramorium sp. G (*striolatum* gp.)				1	1	1		1														7
Tetramorium sp. H (*striolatum* gp.)																						2
Tetramorium sp. I (*striolatum* gp.)																	1					1
Tetramorium sp. J (*striolatum* gp.)								2														2
Tetramorium sp. K (*striolatum* gp.)				2																		2
Tetramorium sp. L (*striolatum* gp.)				6										8					2			16
Tetramorium sp. N (*striolatum* gp.)																				1		1
Tetramorium sp. S (*striolatum* gp.)								1														1
subfamily Dolichoderinae																						
Anonychomyrma sp. A (*itinerans* gp.)								3														3
Anonychomyrma sp. B (*biconvexa* gp.)					5				17											2		24
Arnoldius sp. A			1																			1
Dolichoderus scrobiculatus	2		1				4				3	2	2	1		1	1	3	1			49
Iridomyrmex brunneus	50			2				1				7										277
Iridomyrmex ?chasei	25	57		84		20			50			100										1150
Iridomyrmex discors																						37
Iridomyrmex nr. *dromus*																	2					9
Iridomyrmex ?hartmeyeri																						3
Iridomyrmex purpureus			21			20	100	100	20	51	100		1	51	100		6	100				924
Iridomyrmex septentrionalis		50		50		50							53			5	36			60		454
Iridomyrmex suchieri	5	50	100	51	80	45	75	56	100	35	47		50	14	36	35	100		50	100		1900
Iridomyrmex suchieroides					50																	64
Iridomyrmex nr. *suchieroides*																						50
Iridomyrmex sp. A (*anceps* gp.)																						72
Iridomyrmex sp. G (*bicknelli* gp.)	1								3		3											11
Iridomyrmex sp. B (*mjobergi* gp.)	2		53	50	59		8	27	4		1	50	7	5		5				4		326
Iridomyrmex sp. D (*mjobergi* gp.)	16			8	8	76			2					23		4	6	2	18			215
Iridomyrmex sp. J (*mjobergi* gp.)		2																		1		4
Iridomyrmex sp. P (*mjobergi* gp.)									22	7	1											32
Iridomyrmex sp. C (*rufoniger* gp.)	50	50	50						50				51						100			1010
Leptomyrmex rufipes																	1					1
Leptomyrmex varians	6	1	3		3		5	1		8	8			10	7	15		8	18			94
Ochetellus clarithorax					1		3			2	1		2	16			2					74
Ochetellus sp. B			1	3	3	1					1											18
Ochetellus sp. C		1				1					3					52		2				63
Papyrius sp. A										7				3			1					11
Tapinoma sp. A (*minutum* gp.)	2					1	4				3		4			3		3				63
Tapinoma sp. B (*minutum* gp.)					1	5			1					1	2				3			114
Tapinoma sp. C (*minutum* gp.)	5									4				7	5	1	2					68
Technomyrmex antoni	1		3	13	45		1		3											3		271

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M11A	M11B	M12	M13	M14A	M14B	M15A	M15B	M16A	M16B	M17		
subfamily Formicinae																						
Acropyga sp. A																						1
Calomyrmex albopilosus	3		1	28		13		1	8	50	20	8		7								171
Calomyrmex similis			8		12		3															31
Camponotus aeneopilosus	13				4		1	14														50
Camponotus nr. *consobrinus*			3																			12
Camponotus dromas				2		2	1			1	1	1			3		1	2				17
Camponotus ephippium																						4
Camponotus extensus			1	2			2	2														7
Camponotus loweryi	4		13	1	3		4	4					1						1			78
Camponotus nr. *nigriceps*	3			1	2	3				2	2		1	3				1	2			53
Camponotus suffusus																						2
Camponotus nr. *vitreus*								1														1
Camponotus whitei	1				1	1											1	2				8
Camponotus sp. B (*claripes* gp.)				1	2																	5
Camponotus sp. F (*claripes* gp.)	1		1			1							1									9
Camponotus sp. H (*claripes* gp.)				5	1	3			2			4		2	1				2			27
Camponotus sp. R (*claripes* gp.)																						1
Camponotus sp. W (*claripes* gp.)					3	4			2		1	2					1		2			30
Camponotus sp. BA (*claripes* gp.)										1												1
Camponotus sp. BC (*claripes* gp.)						1						3										4
Camponotus sp. CA (*claripes* gp.)										1												1
Camponotus sp. CB (*claripes* gp.)				1																		1
Camponotus sp. E (*discors* gp.)																						3
Camponotus sp. BK (*discors* gp.)						2				1						2						6
Camponotus sp. K (*ephippium* gp.)																						3
Camponotus sp. A (*minimus* gp.)		1	1							2					3	5			1			14
Camponotus sp. BF (*nigroaeneus* gp.)																		2				2
Camponotus sp. BL (*nigroaeneus* gp.)																						2
Camponotus sp. C (*novaehollandiae* gp.)			4			2				5				1	1				1			15
Camponotus sp. O (*novaehollandiae* gp.)										4	5	1										10
Camponotus sp. D (*rubiginosus* gp.)																						1
Camponotus sp. G (*rubiginosus* gp.)	1		3			3	3		5		4	5		2								37
Camponotus sp. L (*subnitidus* gp.)						1																1
Camponotus sp. X (*subnitidus* gp.)														2								2
Melophorus sp. L (*aeneovirens* gp.)	36		50	16	50	50	50	47	38	24	16	8	5	19	12		12	7	3	2		500
Melophorus sp. BI (*aeneovirens* gp.)										1												1
Melophorus sp. B (*bruneus* gp.)									2													4
Melophorus sp. W (*bruneus* gp.)						2		1			4											7
Melophorus sp. R (*fieldi* gp.)		4		3		9	2		4		1		3	4	50	19	6					107
Melophorus sp. BH (*fieldi* gp.)										10												10
Melophorus sp. A (*froggatti* gp.)	3			4		15	2		7				3							1		67
Melophorus sp. H (*froggatti* gp.)	10		1	2	9		3			24	34	21		12	13	2	26	3	9			190
Melophorus sp. C (*mjobergi* gp.)		1				1				1	6			9	2	5	14		22			67
Melophorus sp. F (*mjobergi* gp.)	3	17		11	48	27		13	45		40	18	4	21	2		22	14	15	2		331
Melophorus sp. I (*mjobergi* gp.)																						5
Melophorus sp. K (*mjobergi* gp.)	50	50	44	47	13	54	14	28	38	50	11	7		31			37	1		32		538
Melophorus sp. AE (*mjobergi* gp.)															1							1
Melophorus sp. AO (*mjobergi* gp.)										20					2		2	10				47
Melophorus sp. BG (*mjobergi* gp.)												12										12
Melophorus sp. E (*pillipes* gp.)		1	8		37		10	1	2						33		15		2			118
Melophorus sp. AH (*pillipes* gp.)	50	1			1			2	3				9	2			2	6		1		154
Melophorus sp. P (*turneri* gp.)														1								2
Melophorus sp. T (*turneri* gp.)			4																			5
Melophorus sp. O (*wheeleri* gp.)	50					48			15													115
Melophorus sp. S (Group B)		16	5	1					8				1									35
Melophorus sp. AT (Group C)																						1
Melophorus sp. AM (Group J)													1									1
Melophorus sp. CA (Group M)														1								1
Notoncus subdentata	9		4	57	13	39		4	23	2	40	20	18	12	47		6	6	60			1194
Notoncus sp. C (*ectatommoides* gp.)		3	4																	11		24
Notoncus sp. D (*ectatommoides* gp.)		7			1																	9
Notoncus sp. E (*enormis* gp.)	5	1	2		2			8					10							2		140
Notoncus sp. F (*enormis* gp.)																						88
Notoncus sp. G (*enormis* gp.)																						53
Notoncus sp. I (*giberti* gp.)																						1
Nylanderia rosae		2	1	1	1					50	38	30		34	50		50	1	2			486
Nylanderia sp. A (*vaga* gp.)	14	1	1	8	30	22	11	1			1					15	7					198
Nylanderia sp. C (*obscura* gp.)	1			8	6	11				2	2	1			1		7					180
Opisthopsis pictus	2		1		5			2	4	4				1								29
Opisthopsis rufithorax			1	7								1										18
Paraparatrechina sp. A (*minutula* gp.)						6								1	2				12			62
Paraparatrechina sp. B (*minutula* gp.)					2					1	15	1		1		3	1	8				78
Paraparatrechina sp. D (*minutula* gp.)															2							42
Paraparatrechina sp. E (*minutula* gp.)																						1
Paraparatrechina sp. F (*minutula* gp.)																						2
Paraparatrechina sp. G (*minutula* gp.)																						3
Paraparatrechina sp. H (*minutula* gp.)	1						4			1						2						8
Polyrhachis conciliata															7				2			9
Polyrhachis hookeri																						1
Polyrhachis insularis										1			1									3
Polyrhachis lata		1				1		2					1	1								7
Polyrhachis lydiae						1					1											3
Polyrhachis micans																						1
Polyrhachis prometheus			1	17		3																24
Polyrhachis nr. *senilis*	1			2		3			3		2		1				2		1			24
Polyrhachis sp. K (*schwiedlandi* gp.)														1								2
Prolasius sp. A (*reticulata* gp.)																						1
Stigmacros aciculata																						1
Stigmacros aemula														3		1						6
Stigmacros nr. *inermis*		1																				1
Stigmacros intacta		1													3			1				20
Stigmacros pilosella																						7
Stigmacros pusilla																						1
Stigmacros sp. A (*flavinodis* gp.)																	1	1				7
Stigmacros sp. N (*pusilla* gp.)																						
Total	725	430	510	703	797	934	603	466	849	674	831	508	387	658	586	321	754	456	551	405		24071
No. species	56	44	62	48	54	65	41	42	52	59	51	46	39	54	48	32	52	41	44	35		265

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FOR FURTHER INFORMATION

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