THE EFFECT OF WILDFIRE ON THE FRUITING OF MACROFUNGI IN REGROWTH KARRI FORESTS II. RESULTS FROM THE SECOND YEAR OF MONITORING

SPP 98/0015 Progress Report

by

RICHARD M. ROBINSON

Department of Conservation and Land Management
CALMScience Division
Manjimup, WA

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Geopyxis aff. *carbonaria*, x 2

Neolentinus dactvloides. x 0.15

Agaric (Species 64), x 1.25

Anthrocobia muelleri. x 1.5

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SUMMARY

In 1999, the second year of monitoring the effects of a wildfire on the fruiting of macrofungi in karri regrowth forests, a total of 184 species of fungi were recorded. Of these, 98 species were recorded from burnt plots and 123 from unburnt plots. Thirty seven species fruited on both burnt and unburnt plots. The number of species on burnt plots increased by 24 from 1998, however, only 27 species were recorded in both 1998 and 1999. On the unburnt sites the number of species remained the same as that recorded in 1998; however, only 70 species fruited in both years. This represents a 72% and a 43% change respectively in species composition on the burnt and unburnt sites. In the first year of monitoring 4.8% of the species were recorded in both burnt and unburnt plots, in the second year this increased to 20%. The increase can be attributed to accumulation of leaf, twig and small branch litter in the plots over the two years. Twenty seven species of saprophytic fungi were recorded in both burnt and unburnt plots.

The most common fungi recorded in the burnt plots were *Coprinus* aff. *domesticus*, *Inocybe* sp. (Species 128), *Ramaria ochraceosalmonicolor, Pulvinula archerii* and *Marasmius* sp. (Species243). Those fungi most often recorded on the unburnt plots were *Anthracophyllum archerii*, Species 164 (LBM "olive gills"), *Marasmius crinisequi, Marasmius elegans, Mycena* aff. *rorida*, Peziza (aff. *Nothojafnea*) sp. (Species 189) and *Plectania* sp. (Species 190). Of the 27 species occurring on both site types, *Inocybe australiensis*, *Marasmius alveolaris*, *Mycena alcalina*, the small stalked Discomycete (Species 51) and *Xylaria hypoxylon* were recorded as being the most common.

The pyrophilous fungi were found to fit into three broad groups: those species fruiting from subterranean sclerotia (Group 1), such as *Neolentinus dactyloides*, *Polyporus tumulosa, P. mylittae, P. sclerotinus* and *Morchella elata*; those species which fruited exclusively on burnt soil in the first year only (Group 2), such as *Peziza* spp. including *Peziza tenacella*, *Geopyxis* aff. *carbonaria*, Species 64 (Agaric), Species 30 (LBM) and *Coprinus* sp. (Species 64) and those species which fruited on burnt soil in large numbers in the first year and again in lower numbers in the second year (Group 3), such as *Anthrocobia muelleri*, *Pulvinula archerii*, *Coprinus* aff. *domesticus* and *Inocybe* sp. (Species 128).

INTRODUCTION

In forest ecosystems fungi play important roles in the decomposition of organic matter and nutrient cycling, and many species form intimate and essential associations with the roots of forest plants (mycorrhiza). At present very little is known regarding the fungal flora of karri regrowth forests and the role these fungi play in ecosystem sustainability. Any changes in species composition mediated by fire may well impact on the rehabilitation of burnt sites.

Early studies (Seaver 1909, Seaver and Clark 1910) showed that many species of fungi occurr only on burnt sites. These species were referred to as "pyrophilous" fungi. In South Australia, Warcup (1990) recorded 14 species of discomycetes in the first year following a fire in dry sclerophyll eucalpt forest dominated by *Eucalyptus maculata*. The most common species Warcup recorded were *Anthracobia melaloma*, *Anthrocobia* cf. *maurilabra*, *Aleuria venestula*, *Pulvinula archerii* and *Lachnea vinosobrunnea*. Species of *Anthracobia* and *Pulvinua* are well known as pyrophilous species both in Australia and elsewhere (Arora 1986, May and Fuhrer 1989, Petersen 1970, Rifai 1968, Warcup 1981). El-Abyad and Webster (1968) concluded that so called "pyrophilous" fungi favour alkaline conditions, which are provided by the ash-bed effect following fire (Hatch 1960, Humphries and Craig 1981). Petersen (1970) showed that the species composition on a range of burnt sites in Denmark changes over time, and species of pyrophilous fungi are replaced, over time, by species more common on unburnt soil.

In the first year following a wildfire on December 25, 1997, Robinson (1999) reported a distinct mycoflora fruiting in burnt plots established in 20-25-year-old karri regrowth stands. Species diversity was higher on the unburnt (control) sites and at its maximum on both burnt and unburnt sites in the autumn. Fruitbody production was higher on the burnt sites with peaks of equal magnitude in both autumn and spring. On the unburnt sites, fruitbody production reached a peak in the autumn and gradually declined through the winter with a small peak in the spring.

On the burnt sites, *Polyporus mylittae*, *P. tumulosa* and *Neolentinus dactyloides* responded by developing large fruitbodies from subterranean sclerotia within days following the fire. In the autumn and spring, Ascomycetes dominated the fruiting. *Peziza tenacella* and *Anthrocobia muelleri*, fruited in large numbers from April to mid-June. *Morchella elata*, *Pulvinula* sp. and a small species of *Peziza* fruited in large numbers from July to late-October. As the result of animal activity on the burnt sites, several collections of *Mesophellia* sp. were recovered from mammal diggings and *Psilocybe coprophilla* was commonly collected fruiting on kangaroo droppings.

The high species diversity on the unburnt sites was attributed to litter decaying species such as *Mycena* and *Marasmius* which were recorded fruiting on leaf and twig litter. In addition several common genera of mycorrhizal fungi, including species of *Cortinarius* and *Russula*, found on the unburnt sites were not recorded on the burnt sites.

The results from the second year of monitoring are presented in this report.

METHODS

Site selection, plot establishment and monitoring, and the methods of specimen collection and processing are detailed in Robinson (1999). Originally six sites were chosen in both burnt and unburnt stands of 20-25-year-old karri regrowth. At each site 4 plots, 5m x 5m, were installed, making a total of 48 plots (24 on burnt and 24 on unburnt sites). However, due to restrictions on time and personnel this was reduced to 36 plots, 18 on burnt and 18 on unburnt sites (Table 1). It was decided not to include the Curtin 1 and Curtin 2 sites in the survey. At these sites the fire burnt with a higher intensity, killing most tree stems. This resulted in basal coppicing rather than the stem and crown coppicing which had occurred on all other sites. The control sites were similarly reduced by not including the Cripple 1 site and two plots at the Wallace Road site. Plots were monitored on a monthly basis until the fruiting season commenced (mid-May) at which time they were visited every 2 weeks until the end of the fruiting season (late-October, early-November). Monthly visits were then resumed. On each date, the number of species and total number of fruitbodies were recorded in each plot. Voucher specimens were photographed *in situ* and collected. At the lab the vouchers were given numbers and species descriptions were prepared. All vouchers are housed in the Tony Annels Herbarium at Manjimup.

Table 1. Characteristics of sites chosen for fungal survey.

Site Number	Site Locations		Year of Regeneration	Plot Numbers	Community Type[1]
	Burnt	Unburnt			
1	Gobblecannup		1979	9-12	Stewart
2	Flybrook		1972	13-18	Beggs
3	June Rd 1		1978	19-22	Stewart
4	Landing Rd		1977	23-26	McNamara
5		Cripple Rd 2	1980	5-8	Shea/Stoate/ White
6		June Rd 2	1978	9-12	Beggs/White
7		Wallace Rd	1981	13, 16	Beggs
8		Lockyer Rd	1980	17-20	Beggs/Annels
9		Flybrook	1978	21-24	Shea

[1] Community type is based on the floristic attributes of Inions *et al*. (1990). NB. Stewart, Beggs and McNamara community types belong to Community-Group 3, which occurs on drier sites with low summer rainfall, high radiation all year and soils with low P levels.

RESULTS AND DISCUSSION

As a result of monitoring the plots throughout 1999, 184 species of fungi were recorded. Of these 98 species fruited in plots on the burnt sites and 123 species in plots on the unburnt sites, including 37 species which were recorded from both site types. In contrast to the results from 1998 (Robinson 1999), which showed that the production of fruitbodies on the burnt sites was over twice the number recorded on the unburnt sites (9,287 on burnt, 4,292 on unburnt), 6,289 fruitbodies were recorded on the unburnt sites and 3,333 fruitbodies were recorded on the burnt sites. Of the 98 species recorded on the burnt sites, only 27 were recorded in 1998. This represents a

72% change in the species composition of the fungal flora which occupied the sites immediately following the fire. There was also a 43% change in species composition on the unburnt sites. Only 70 of the 123 species recorded on the unburnt sites were also recorded in 1998.

All the species recorded in both 1998 and 1999 are shown in Appendix 1. It must be reiterated that many of these species are as yet unidentified and possibly undescribed, and as taxonomic studies continue the number of species will change. This has proved to be the case for the species collected in 1998. Continuing taxonomic examination of the collections from 1998 has reduced noticeably the number of species reported in Robinson (1999). The revised figures for 1998 are detailed in Table 2, alongside figures for 1999, and it is likely that these figures will change again following future taxonomic examination.

Table 2. The number of species recorded on burnt and unburnt sites in 1998 and 1999. The actual figures reported in Robinson (1999) are listed. The revised figures for 1998 reflect the current status, following ongoing taxanomic study, of those species collected and recorded in 1998.

Site Details	1998 (Robinson 1999)	1998 Revised	1999
Total number of species recorded on Burnt sites	89	72	98
Species occurring on burnt sites only	80	61	61
Species fruiting in successive years			27
Total number of species recorded on Unburnt sites	149	123	123
Species occurring on unburnt sites only	140	112	86
Species fruiting in successive years			70
Species recorded on both Burnt and Unburnt sites	9	11	37
Species fruiting on both sites in successive years			9
Total number of species	220 (226*)	184	184

* Actual figure reported for the total number of species included six species from outside the plots (see Appendix 1 in Robinson 1999).

On the burnt sites a dramatic increase in leaf and twig litter had taken place. Plate 1 (page 5) illustrates the change which has taken place on the burnt sites during the two years following the fire. Karri trees which had suffered crown scorch during the fire shed their scorched leaves soon after the fire. During 1999 these leaves had begun to decompose and the overhead trees had shed more leaves and small dead branches, adding new leaf litter and woody debris to the plots. This litter layer had become colonised by many species of saprophytic fungi and was in various stages of decomposition.

Stem and basal coppice of karri and marri, sprouting shrub species such as *Bossiaea linophylla, Persoonia longifolia, Hibbertia cuneiformis, Podocarpus drouynianus* and *Macrozamia riedlei,* and seedlings of *Acacia urophylla, Trymalium floribundum, Pimelia clavata* and *Hovea elliptica* and the climber *Clematis pubescens* were common on the burnt plots. Many burnt stumps from dead understorey species had become colonised by wood decay fungi.

Plate 1

A. Gobblecannup – Plot 12 on 22 Jan. 1998

B. Gobblecannup – General site on 2 July 1998

C. Gobblecannup – General site on 18 Jan. 1999

D. Gobblecannup – General site on 7 Dec. 1999

E. June Road – Plot 20 on 18 Jan. 1999

F. June Road – Plot 20 on 7 Dec. 1999

Plate 1: This series of photos illustrates the recovery of the burnt sites following the fire. **A-D**. The general site at Gobblecannup. The photos were taken from two reference points. Photo A is Plot 12, looking southwest across the plot. Photos B-D were taken 50 m north of photo A, looking southwest across the general site. **A**. Gobblecannup 3 weeks after the fire. The photo shows that the scorched leaves have already been shed from the canopy. **B**. Gobblecannup 6 months after the fire. The photo shows coppice on the stems of karri and at the base of killed understory marri. Resprouting understory shrubs such as *Macrozamia reidleri* and *Podocarpus drouynianus* are present. **C**. Gobblecannup 13 months after the fire. Marri coppice has grown dramatically, and *Pteridium esculentum*, *Hibbertia cuneiformis* and *Clematis pubescens* are present in the understorey. **D**. Gobblecannup 24 months after the fire. The karri trees are shedding bark from their trunks and small branches from their crowns **E**. Plot 20 at June Road, at the start of the second year of monitoring. **F**. Plot 20 at June Road, at the end of the second year of monitoring. The increase in ground cover due to the regenerating shrub and herb layer is evident.

On both burnt and unburnt sites, species diversity peaked in the first week of June. On the burnt sites species diversity declined gradually as the winter progressed. The continual post autumn-winter decline was interrupted by a brief peak in the spring. On the unburnt sites diversity stayed high until mid-July then declined gradually through the remainder of the year (Fig. 1).

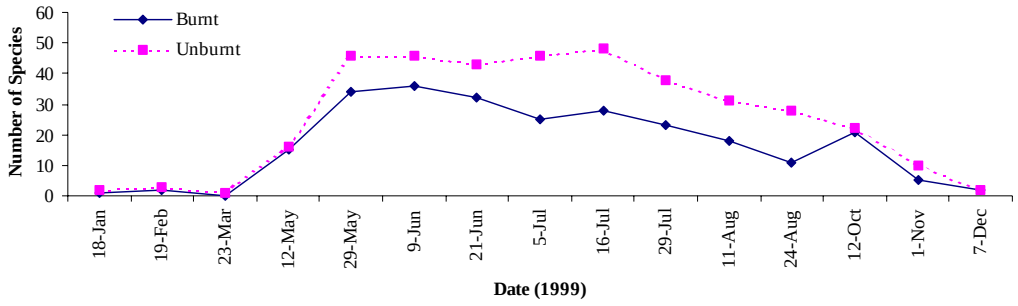


Figure 1. The number of fungal species recorded in burnt and unburnt karri regrowth plots in 1999.

Fruitbody production peaked in late-autumn and spring on both burnt and unburnt sites (Fig. 2). In 1998, the initial autumn flush in unburnt plots occurred 4-6 weeks after a high rainfall period in March. In 1999, the first heavy rains did not occurr until April and the autumn flush of fungi on the unburnt sites occurred simultaneously. In April-May the soil profile was still very dry, however, the organic surface and litter layers held enough moisture to stimulate fruit production. In 1998, the autumn flush of fungi in the burnt plots was more gradual than that on the unburnt sites and peaked approximately 10 weeks after the March rains. The later peak on the burnt sites may be attributed to the lack of organic surface soil and litter in the soil profile, needed to hold the moisture in the upper soil profile. In 1999 the delay was approximately 4 weeks. As the litter layer returns to the burnt sites, it would be expected that the autumn fruiting peaks will occur simultaneously on both site types.

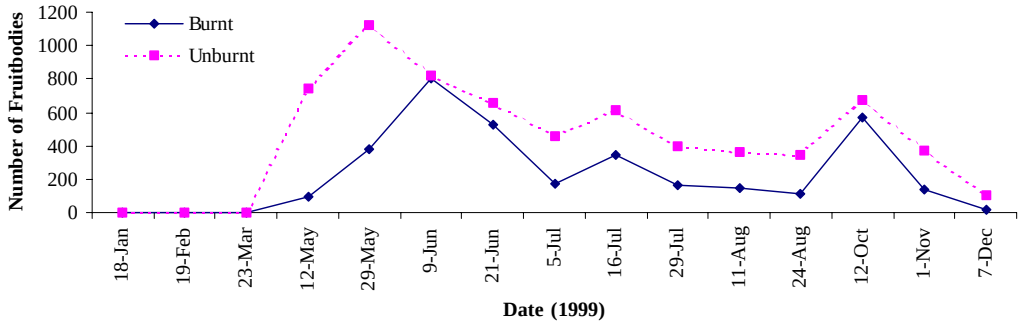


Figure 2. The number of fungal fruitbodies recorded in burnt and unburnt plots in 1999.

In 1998, the rainfall peaked in the autumn. In 1999 it peaked in early winter then gradually declined through the winter and dropped dramatically in the spring (Fig. 3). However, surface moisture remained high enough to allow a spring fruiting flush to occur on both site types in mid-October (Fig. 3).

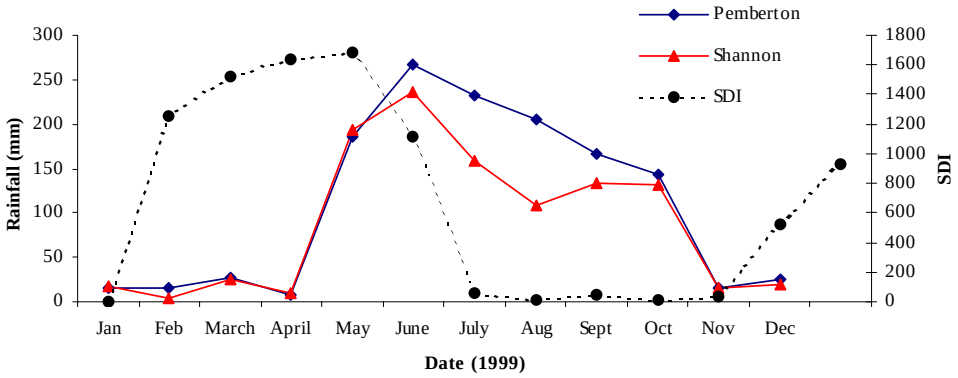


Figure 3. The total monthly rainfall measured at Shannon and Pemberton in 1999 and the Soil Dryness Index (SDI) calculated at Pemberton on the 15th day of each month in 1999.

Species associated with burnt sites

BASIDIOMYCETES

The sclerotial fungi, *Polyporus tumulosa*, *P. mylittae* and *Neolentinus dactyloides*, which fruited in abundance immediately following the fire, failed to fruit in 1999. In 1998, a number of fruitbodies outside the plots were tagged. Excavations during 1999 revealed that sclerotia of *P. mylittae* had disintegrated, leaving very little sign of its initial presence, and those of *N. dactyloides* had either disintegrated or had shriveled into a hard horny mass. This is consistent with the theory that these sclerotia are a nutrient source solely for the production of fruitbodies.

Eighty two species of Basidiomycetes were recorded on the burnt plots in 1999. Sixty one of these species were not recorded in 1998. There was a marked increase in the number of species associated with leaf, twig and log decay, 29 species in 1998 and 55 in 1999. These included 16 species of *Mycena*, 6 species of *Marasmius*, 2 species of *Pleurotus*, 2 species of *Gymnopilus*, a species of *Tremella* and *Heterotexus peziziformis*. In 1998 only 6 species of *Mycena* were recorded and only one of these was recorded again in 1999, *M. sanguinolenta* (Pl. 2a). *Mycenas* recorded for the first time in 1999 included *Mycena* sp. (Species 232) (Pl. 2b) a tiny white species which friuted on bare soil and *Mycena* spp. (Species 230 and 226) which fruited on leaf litter. Species 230 and 226 were very similar in appearance, being separated by the strong bleach odour given off by Species 226. In 1998, 13 mycorrhizal species were recorded on the burnt plots, in 1999 this increased to 26 species. This included included 5 species of *Cortinarius*, 6 species of *Inocybe* and 3 species of *Paxillus*.

Twenty two species of Basidiomycetes were recorded on the burnt sites for the second year in succession. The most common being, *Coprinus* aff. *domesticus* (Fig. 4a) fruiting on and around small burnt understorey stumps, *Inocybe* sp. (Species 128) (Fig. 4a) and *Marasmius* sp. (Species 243) (Pl. 2c, Fig. 4a) fruiting on bare soil and

Psilocybe coprophya fruiting on kangaroo droppings (Fig. 4b). *Paxillus* sp. (Species 10) (Pl. 2d, Fig. 4b)) was recorded in low numbers in 1998, in 1999 it was recorded in moderate numbers in the plots and was very common in the general area surrounding the plots.

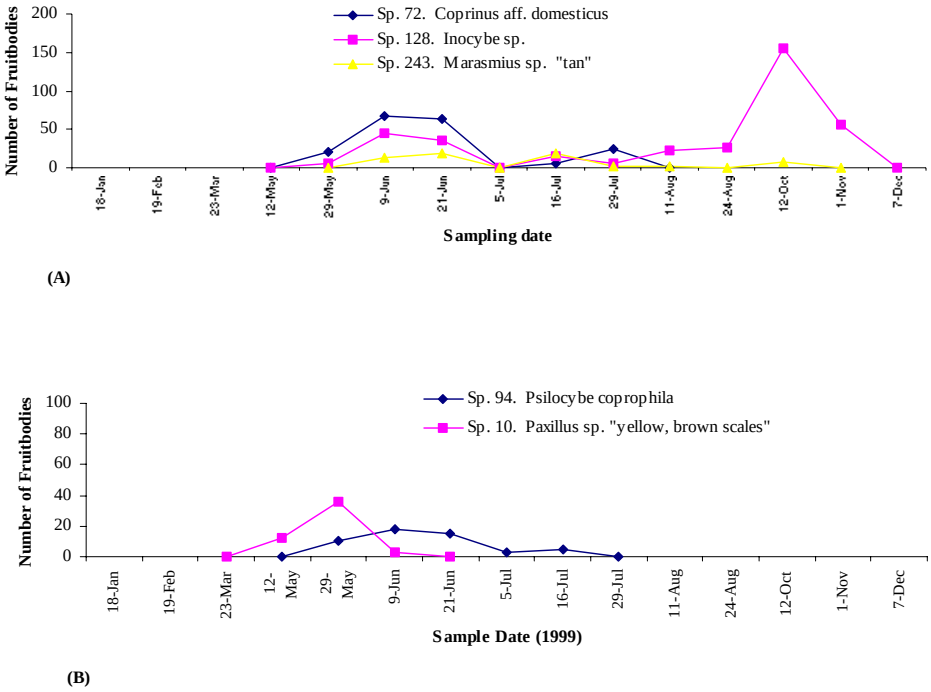


Figure 4. (A), (B). The fruiting patterns and the number of fruitbodies recorded for several Basidiomycetes which fruited on the burnt sites for the second year (1999).

The most common species fruiting in the burnt plots in 1999 was *Ramaria ochraceosalmonicolor* (Pl. 2e, Fig. 5). Only one fruitbody of *R. ochraceosalmonicolor* was recorded in 1998, however in 1999 it was very abundant in the autumn and persisted in low numbers until mid-spring. It is mycorrhizal (Bougher and Syme 1998) and usually fruited under or was partly obscurred by the leaf litter. It has not been recorded as favouring recently burnt sites before.

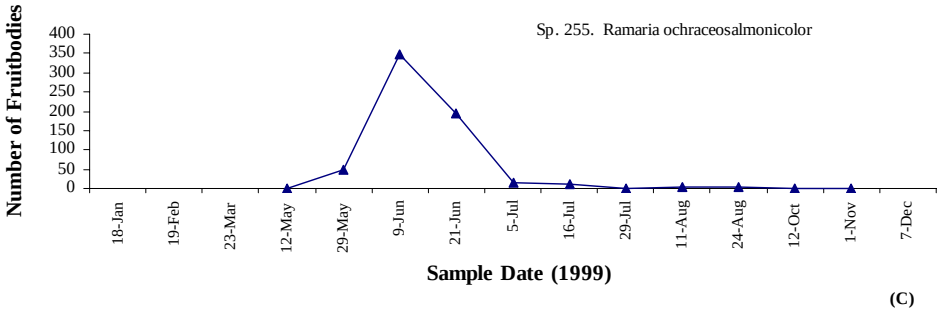


Figure 5. The fruiting pattern and the number of fruitbodies recorded for *Ramaria ochraceosalmonicolor* which fruited on the burnt plots in 1999.

Plate 2

BURNT SITES

Species of fungi commonly associated with burnt karri regrowth sites in the second year (12-24 months) following a wildfire

(a) *Mycena sanguinolenta*, x 1

(b) *Mycena* sp. (Species 232), x 2

(c) *Marasmius* sp. (Species 243), x 1.25

(d) *Paxillus* sp. (Species 10), x 0.5

(e) *Ramaria ochraceosalmonicolor*, x 0.5

(f) *Daldinai concentrica*, x 1

(g) Discomycete (Species 303), x 1.75

ASCOMYCETES
Sixteen species of Ascomycetes were recorded on the burnt plots in 1999 (compared with 24 species in 1998) and only four species were recorded for the second year in succession . Pyrophilous Ascomycetes such as *Peziza tenacella*, *Geopyxis* aff. *carbonaria* and *Peziza* spp. (Species 22, 196 and 41) which fruited in large numbers in the autumn of 1998 and *Morchella elata* which fruited prolifically in the spring of 1998 did not fruit in 1999. However, the small disc fungus *Pulvinula archerii* (Species 66b) was again abundant on bare soil, fruiting in large numbers in the spring as it did the previous year (Fig. 5). *Anthrocobia muelleri* was also recorded again, but in low numbers.

Several other species of Ascomycetes commonly recorded on the burnt plots as an indirect result of the fire were *Daldinia concentrica* (Pl. 2f, Fig. 5) fruiting on the burnt stumps of *Bossiaea linophylla* and a small yellow, stalked Discomycete (Species 303) (Pl. 2g, Fig. 5) fruiting on the fallen fruits of *P. drouynianus*. *Podocarpus drouynianus* plants on the unburnt sites did not fruit. However, on the burnt sites, *P. drouynianus* resprouted rapidly into large bushes and fruited heavily in the summer of 1998/99.

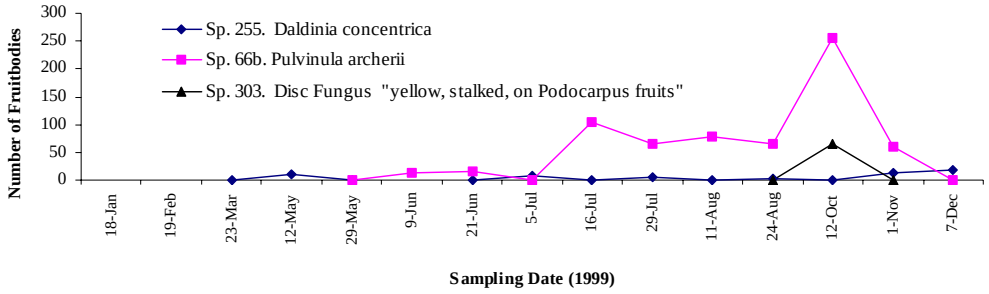


Figure 5. The number of fruitbodies produced for several species of Ascomycetes recorded in the burnt plots in 1999.

Species associated with unburnt sites

BASIDIOMYCETES
One hundred and four species of Basidiomycetes were recorded in the unburnt plots in 1999. This compares favourably with the 115 species recorded in 1998, however, only 67 species were recorded for the second successive year. This illustrates the year to year variation which occurs in fungal fruiting behaviour (i.e. a total of 48 species recorded in 1998 did not fruit in 1999 and 37 species recorded in 1999 did not occurr in 1998). The most common fungi present were saprophytes and included 20 species of *Mycena*, 8 species of *Marasmius*, 3 species of *Crepidotus*, 8 species of Coral Fungi including species of *Clavicorona*, *Clavulina* and *Clavulinopsis* and 10 species of wood decay fungi belonging to the Polypores and Thelephores. Mycorrhizal fungi included 6 species of *Inocybe*, 3 species of *Russula*, and 3 species of *Tricholoma*.

The species which fruited prolifically in 1999 were *Anthracophyllum archerii* (Pl. 3a) and *Marasmius alveolaris* on small branches in the litter, *Marasmuius* sp. (Species 92) on karri bark, *Marasmius crinisequi*, *M. elegans* (Fig.6), *Mycena* aff.

austrororida, *M. alcalina*, *Mycena* sp. (Species 146) (Fig.7) and LBM "olive gills" (Species 164) (Pl. 3b) on leaf litter and *Inocybe australiensis* (Fig. 8) which is mycorrhizal.

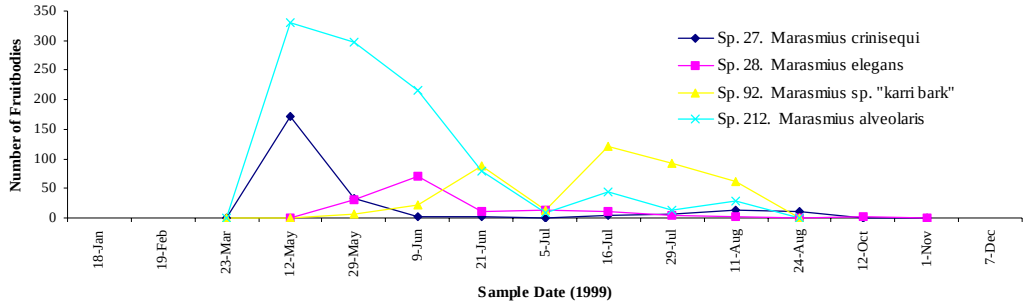


Figure 6. The number of fruitbodies produced and the fruiting pattern for several species of *Marasmius* fruiting on leaf and twig litter in the unburnt plots in 1999.

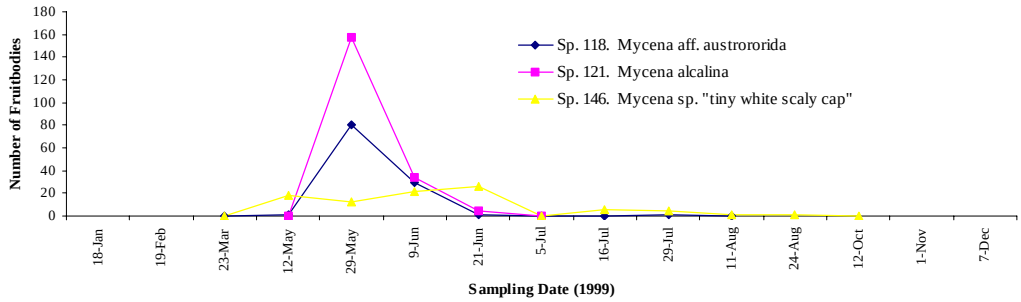


Figure 7. The number of fruitbodies produced and the fruiting pattern for several species of *Mycena* fruiting on leaf litter in the unburnt plots in 1999.

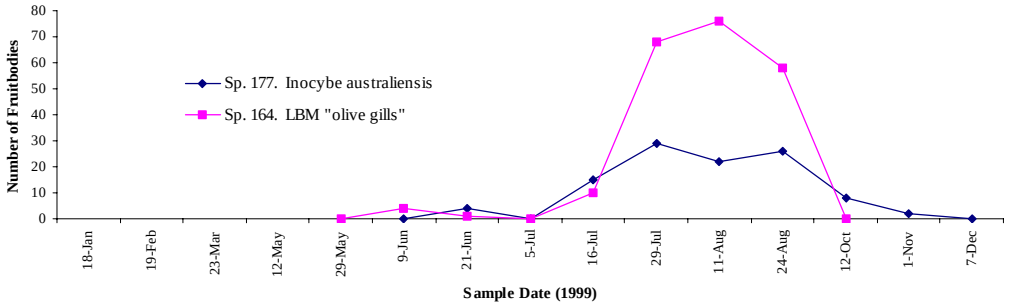


Figure 8. The number of fruitbodies produced and fruiting pattern for *Inocybe australiensis* and Species 164 recorded in the unburnt plots in 1999.

Other species which fruited in moderate numbers were *Panellus ligulatus*, *Heterotexus peziziformis* (Pl. 3c) and *Mycena* sp. (Species 24) on twigs and small branches in the litter, *Mycena* sp. (Species 153, "buff umbrella) and *Macrotyphula* aff. *junceus* (Pl. 3d) on leaf litter.

Plate 3

UNBURNT SITES

Species of fungi commonly associated with unburnt karri regrowth sites in the second year (12-24 months) following a wildfire

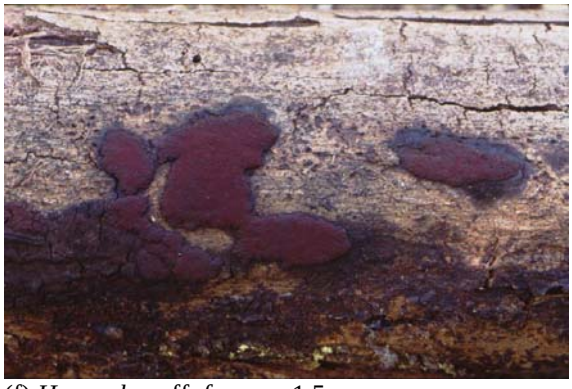
(a) *Anthracophyllum archerii*, x 1

(b) LBM “olive gills” (Species 164), x 2.5

(c) *Heterotexus peziziformis*, x 2

(d) *Macrotyphula* aff. *junceus*, x 1

(e) *Cortinarius* sp. (Species 143), x 0.3



(f) *Hypoxylon* aff. *fusca*, x 1.5

(g) *Hypoxylon* sp. (Species 192), x 2

In 1998, 7 species of *Cortinarius* were recorded in the unburnt plots, in 1999 only 3 species were recorded, *Cortinarius* sp.4 (Species 143) (Pl. 3e), *Cortinarius* sp.6 (Species 175) and *Cortinarius* sp.14 (Species 284). They all fruited for the second consecutive year, but in low numbers.

ASCOMYCETES

In 1998, only 8 species of Ascomycetes were recorded in the unburnt plots. In 1999 a total of 19 species of Ascomycetes were recorded and 6 species fruited for the second successive year. The most common species were *Plectania* sp. (Species 190) and *Xylaria hypoxylon* (Fig.9). *Plectania* sp. is a black cup-shaped fungus with a well formed network of mycelium extending from the base of the cup into the leaf and twig litter. *Xylaria hypoxylon* is a wood decay fungus, colonising dead understory stumps and small diameter branches in the litter. A third species, aff. *Nothojafnea* sp. (Species 189), a small cup fungus fruited *en masse* on the surface of bare soil in one plot in Flybrook (Fig.9). All three species are saphrophytic and fruited for the second year in succession.

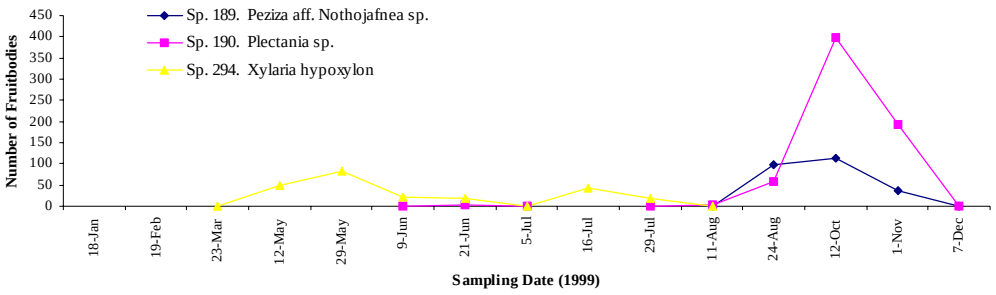


Figure 9. The number of fruitbodies produced and fruiting pattern for three species of Ascomycetes recorded in unburnt plots in 1999.

Four species of *Hypoxylon* were also recorded. *Hypoxylon* spp. fruit on dead wood, and some may be weak parasites colonising still living host tissues (Rogers *et al.*1997). *Hypoxylon* aff. *fuscum* (Pl. 3f) was commonly found fruiting on small dead karri branches, *H.* aff. *rubiginosum* and *Hypoxylon* sp. (Species 318) fruited on dead *Trymalium floribundum* wood and *Hypoxylon* sp. (Species 192) (Pl. 3g) fruited on dead *Acacia europhylla* stems.

Species associated with both burnt and unburnt sites

In 1998, 11 species fruited in plots on both burnt and unburnt sites and in 1999 this category had increased to 37 species, including 9 species which fruited on both sites in consecutive years (Table 2). These species and the number of fruitbodies produced by each species are listed in Table 3, those recorded in both years are listed in bold type.

The list includes 27 species which are saprophytic and 10 species which form mycorrhizae. One species (*Mesophellia* sp.) was recorded only on burnt sites, while

Table 3. Species occurring on both burnt and unburnt sites in 1998 and 1999. Species occurring in successive years are in bold type.

Species ID Number	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
	BASIDIOMYCETES					
171/52	*Amanita* sp. "brown-grey/creamy white/creamy white"	M		4	2	10
279	***Amanita xanthocephala***	M	10	2	47	3
141	*Clavulinopsis* sp. "grey-white"	S		2	3	1
175	*Cortinarius* sp. 6 "orange-brown viscid cap/white dry stem"	M		2	1	1
314/142	*Coltricia oblectans* "dark brown pores"	S		9	3	27
122	*Crepidotus* sp. "buff caps on karri bark"	S		43	78	91
167	*Entoloma* sp. "dark brown-black/pink-buff/olive-grey, shiny"	S	1	2		
273	*Heterotexus peziziformis*	S		8	2	26
299	***Hypholoma australe***	S	8	33	6	9
129	Hypogean *Mesophellia* sp.	M	29		5	3
177	***Inocybe australiensis*** "brown wooly cap/flesh-coloured stem"	M	1	35	18	106
133/77	*Inocybe* sp. "peaked tomentose cap"	M		21	3	16
159	*Inocybe* sp. "grey-brown with white fibrils"	M		2	3	3
155	*Laccaria* sp.	M		8	6	26
297	***Macrolepiota konradii***	S	1	2	1	7
28	*Marasmius elegans*	S		215	1	147
92/16/85/47	***Marasmius* sp.** LBM "karri bark, free rim"	S	3	224	7	404
134/223/19	*Marasmius* sp? "brown velvet - on leaves and bark on ground"	S		6	54	40
242a	*Marasmius* sp. "orange brown wheels on bark"	S			1	27
212/80/207	*Marasmius alveolaris* "white-tan wheels"	S		470	29	1113
147/76	*Mycena* aff. *subgallericulata*?	S		20	7	21
121/50	*Mycena alcalina*	S		117	3	195
229/91	*Mycena sanguinolenta*	S	1	1	39	
146	*Mycena* sp. "tiny white scaly cap"	S		23	34	90
219	*Mycena* sp. "14-30mm, grey brown/smokey,/white-grey brown."	S			8	1
232	*Mycena* sp. "2mm white/white (dec)/white, on soil"	S			45	1
211	*Mycena* sp. "3mm, tiny buff"	S			4	16
209	*Mycena* sp. "4-5mm, small buff"	S			28	32
227	*Mycena* sp. "6-10mm, dark brown/creamy white/grey-brown, weak bleach odour"	S			3	3
226	*Mycena* sp. "9-17mm, grey-brown/light grey/grey-brown, bleach"	S			46	12
169	***Ramaria* sp.** "bright yellow"	M	1	4	1	3
222	Thelephore "Hydnoid" (*Trichopatum* sp.?)	S			1	9
131/101	***Tricholoma eucalypticum***	M	20	30	44	29
289	***Tubaria rufofulva***	S	3	18	2	36
	ASCOMYCETES					
51	**Discomycete** "black, stalked"	S	15	105	57	167
240	Discomycete "tiny yellow, stalked"	S			11	30
280/264	Peziza (aff. *Discina* sp.) "brown wrinkled"	S			2	6
253	*Hypoxylon* aff. *rubiginosum* "flat purple"	S			1	2
294	*Xylaria hypoxylon*	S		1	22	234

[1] Life Mode: M = mycorrhizal, S = saprophytic, C = coprophilous, P = parasitic, B = bacteriaphore.

Plate 4

BURNT AND UNBURNT SITES

Species of fungi recorded on both burnt and unburnt sites in 1999.

(a) *Crepidotus* sp. (Species 122), x 1

(b) *Mycena alcalina*, x 0.5

(c) *Mycena* sp. (Species 146), x 1

(d) *Xylaria hypoxylon*, x 0.75

(e) *Marasmius alveolaris*, x 1.75

(f) *Inocybe australiensis*, x 1.5

16 species were recorded only on unburnt sites in 1998. Eleven species were recorded for the first time in 1999. *Entoloma* sp. was recorded on both sites in 1998 but was not recorded on any sites in 1999 and *Mycena sanguinolenta* was recorded only on burnt sites in 1999. All species found on both sites and recorded for the first time in 1999 were saprophytic species, fruiting on well rotted leaf litter, small branches which had fallen from the scorched crowns of karri trees or the decaying stumps of shrubs which were killed in the fire. Six of the 11 species belonged to the genus *Mycena*.

Species which were most prolific included; *Crepidotus* sp. (Species 122) (Pl. 4a) and *Marasmuis* sp. (Species 92) which fruited on the bark of the lower bole of living karri trees, *Mycena alcalina* (Pl. 4b) and *Mycena* sp. (Species 146) (Pl. 4c) on well-rotted leaf litter, *Xylaria hypoxylon* (Pl. 4d) on stumps of dead understory shrubs, *Marasmius alveolaris* (Pl. 4e) on fallen karri branches, the small black Discomycete (Species 51) on the well-rotted surface of burnt logs and the mycorrhizal species *Inocybe australiensis* (Pl. 4f).

The increased number of species fruiting on both site types can be attributed to the production of a litter layer, consisting of leaves, twigs and small branches from the crowns of the overstory trees, on the burnt sites. O'Connell (1989) found that dry weights of litter in karri forests (35-53 years old) ranged from 7 t ha^{-1} for a site burnt one year before sampling to 38-48 t ha^{-1} on sites where litter had accumulated for 40 years. On sites sampled 9 and 9.5 years after fire, the fine fragmented fraction made up almost one-half the litter dry-weigh, twigs contributed about one-third and karri leaves and bark about one-fifth the dry-weight (O'Connell 1989). The litter layer not only provides a substrate for saprophytic fungi but also helps to preserve moisture in the upper soil profile and aids in the control of upper soil temperatures. In southern jarrah forests, Syme *et al*. (1999) found that soils in plots with more litter or more compacted litter were cooler in the summer and warmer in the winter at depths of 7.5 cm and 20 cm. Furthermore, fruiting was related to temperature for many fungal species, with some fungi fruiting when soil temperatures were warmer, others when it was cooler.

Another factor likely contributing to the increase in species recorded on both sites, as well as a change in species composition on the burnt sites, is a change in soil chemistry on the burnt sites. Hatch (1960) noted that the most pronounced changes in soils on burnt karri sites was a rapid decline in pH and loss of soluble salts, especially in the first year following a fire. Petersen (1970) showed similar trends occurring over a three year period in the white ash layer produced by fire on a range of sites in Denmark. He also showed that over this period species of pyrophilous fungi were gradually replaced by species more common on unburnt ground. Thus, rapid changes in soil pH produce conditions no longer favourable for many species of pyrophilous fungi and litter build up enhances the number of saprophytic fungi on burnt sites.

It has been shown that nutrient levels and soil condition in karri and other eucalypt soils may take 10-20 years to return to their pre-fire condition (Hatch 1960, O'Connell 1989, Raison *et al* 1985). Accumulation of nutrients in karri litter is rapid following a fire, however, the release of nutrients such as N and P appears to be slow (O'Connell 1989). While, nitrogen inputs to soil can be greatly enhanced by the regeneration of nitrogen-fixing plants such as *M. reidleri*, especially in the first few

years following fire (Grove *et al.* 1980), saprophytic fungi play an important role in decomposition and release of nutrients from litter, mycorrhizal fungi enhance P and N uptake by plants (Grove *et al* 1996, Tommerup and Bougher 2000), and hyphae of soil-borne fungi contribute to soil structure by binding soil particles (Bougher and Tommerup 2000). However, little is known regarding the species involved and the effect fire has on these processes.

CONCLUSIONS

The results for 1999 support the observation that a distinct and recognisable mycoflora fruits on recently burnt sites in karri regrowth forests (Robinson 1999).

The same number of species, 184, was recorded in the first and second years of monitoring. In the second year, however, there was a 72% change in the species composition of macrofungi fruiting on burnt sites. This is attributed to (i) the absence of sclerotial basidiomycetes which appear to be directly stimulated by the fire to fruit, (ii) the absence of several so called "pyrophilous" Ascomycetes which apear to favour the temporarily high alkaline conditions produced by the ash-bed affect and (iii) the presence of saprophytic fungi colonising the increasing litter and trash layer. Some of the change may also be attributed to seasonal variation in fungal fruiting patterns. On the unburnt sites the same number of species was recorded as the previous year, however, there was less (43%) change in species composition than observed on the burnt sites.

In the first year of monitoring 4.8% of the total species recorded occurred on both burnt and unburnt sites. In the second year this increased to 20%. This is primarily due to changes such as litter accumulation, taking place on the burnt sites. Of the 37 species recorded on both sites, 59.5% fruited on leaf and twig litter and were not recorded in the first year.

The pyrophilous fungi appear to fall into three broad groups. The first group consisting of those fungi which fruited from subterranean sclerotia and are stimulated by, and fruit within days of the fire. These species are; the sclerotial agaric *Neolentinus dactyloides* (illustrated on cover), the sclerotial polypores, *Polyporus mylittae, P. tumulosa* and *P. sclerotinus*. The Ascomycete *Morchella elata* which fruited *en masse* in the spring following the fire should also be in this group. All five species were recorded only in the first year.

The second group is made up of species such as *Peziza tenacella, Geopyxis* aff. *carbonaria* (illustrated on cover), *Peziza* spp. (Species 22, 196 and 41), Species 64 (Agaric) (illustrated on cover), *Coprinus* sp. (Species 73) and Species 30 (LBM). All fruited exclusively on burnt soil in the first autumn following the fire and were not recorded in the second year.

The third group contains species such as *Anthrocobia muelleri* (illustrated on cover), *Pulvinula archerii*, *Coprinus* aff. *domesticus* and *Inocybe* sp. (Species 128) which fruited on the burnt soils in the first season following the fire and continued through the second year in smaller numbers.

There were also other species in the second and third categories, but these were recorded in very low numbers. A fourth group of fungi included species such as *Inocybe* sp. (Species 277) and *Cortinarius* sp.10., which were recorded fruiting on soil on the burnt sites for the first time in the second year. However, more information is needed before it can be ascertained whether these species are exclusive to burnt sites.

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APPENDIX 1. Fungi recorded during 1998 and 1999, following a wildfire in December 1997, in burnt and unburnt plots in karri regrowth forest.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
	BASIDIOMYCETES					
	AGARICS					
246	Agaric aff. *Melanoleuca* sp.	S/M?			1	
139	Agaric "black, black scales"	S		1		
20	Agaric "brick red/yellow/brick red + scales"	S		1		
67	Agaric "brown, brown scales"	S	1			
307	Agaric "bronze, brown gill edges"	S				1
49	Agaric "cinnamon, gilled bracket"	S		4		2
64/2	Agaric "creamy buff, viscid/white/pinkish buff"	S/M?	40			
130	Agaric "dark grey-brown (slimy)/white (waxy)/long buried stem"	S/M?	1			
271	Agaric "olive-yellow"	S			1	
257	Agaric "orange-br, orange-br, yell-br"	S/M?				4
108/108b	Agaric "red gills"	S		3		6
244	Agaric "Wallace"	S				25
300	*Agaricus* sp. "red-brown stain"	M				3
235	*Amanita* sp. "13mm, white, deep rooting stem and volva"	M			2	
171/52	*Amanita* sp. "brown-grey/creamy white/creamy white"	M		4	2	10
ND 17	Amanita sp. "small white/white/white"	M		1		
ND 44	Amanita sp. "Flybrook"	M		1		
279	*Amanita xanthocephala*	M	10	2	47	3
265	*Amanita xanthocephala* (forma *macalpiniana*?)	M				3
296	*Anthracophyllum archerii*	S		79		766
302	*Armillaria luteobubalina*	S/P		2		1
185	*Clitocybe* sp.	S		1		
275	*Clitocybe* sp. "small dark grey"	S				2
283	*Clitocybe* sp. "cream-buff"	S				3
ND 43	*Clitocybe* sp.	S		2		
216	*Collybia* aff. *butracea*	S				40
216B	*Collybia* sp.	S				3
305	*Collybia* sp. "hygrophanous"	S			1	
197	Collybia/Marasmius sp.	S		4		
104	*Concomyces* sp. Gilled Bracket "grey gill edges"	S		10		25
72	*Coprinus* aff. *domesticus*	S	668		181	
74	*Coprinus* sp.2 "large"	S	24		2	
73	*Coprinus* sp.3 "medium"	S	121		1	
281	*Coprinus* sp. "grey scaly cap"	S			1	
311	*Coprinus* sp. "light brown"	S			3	
306	*Coprinus* sp. "tall, grey scaley cap"	S			9	
182	*Coprinus* sp. "mealy scales, long stem - Flybrook"	S	57		8	
111	*Coprinus* sp. "brown mealy scales, short stem – Gobblecannup"	S	2		18	
158	*Coprinus* sp. "light brown, grooved"	S	3			
173	*Cortinarius rotundisporus*	M		1		
138	*Cortinarius* sp. 1 "purple hued Dermocybe"	M		9		
140	*Cortinarius* sp. 2 "light brown, red-brown centre"	M		4		
143	*Cortinarius* sp. 4 (*C. vinaceolamellatus*?) "purple hues"	M		6		10
162	*Cortinarius* sp. 5	M		3		
175	*Cortinarius* sp. 6 "orange-brown viscid cap/white stem"	M		2	1	1
163	*Cortinarius* sp. 7	M		2		
179	*Cortinarius* sp. 8 "covered with soil"	M	1			
231	*Cortinarius* sp. 10 "dark brown, hygrophanous"	M			12	
236	*Cortinarius* sp. 11. "mauve brown/mauve-brown/ mauve"	M			2	

APPENDIX 1…..cont.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
237	*Cortinarius* sp. 12. (*C.* aff *sinapicolor*?)	M			9	
249	*Cortinarius* sp. 13 "red brown with light orange brown margin"	M			1	
284/202	*Cortinarius* sp 14. "brown, conic cap, light brown stem with white mealy white coating"	M		2		3
238	*Crepidotus* sp. "white, tomentose"	S				44
122	*Crepidotus* sp. "buff caps on karri bark"	S		43	78	91
81	*Crepidotus* sp. "light yellow, tomentose"	S		25		
184	*Crepidotus* sp. "white"	S		16		55
136	*Entoloma* sp. "dark brown/salmon-buff/light brown"	S		7		
167	*Entoloma* sp. "dark brown-black/pink-buff/olive-grey, shiny"	S	1	2		
180	*Entoloma* sp. "brown/pinkish-buff/dark brown"	S	2			
183	*Entoloma* sp. "grey-brown/pinkish-brown/grey-brown"	S				
174	*Entoloma* sp. "silver-grey/creamy-pink/silver-grey"	S		2		
310	*Entoloma* sp. "blue-black, black gill edge"	S				2
200	*Entoloma* sp. "blue-black/white with blue tinge/blue-black"	S		1		1
308	*Entoloma* sp. "blue-black/white with blue tinge/black"	S				1
242(b)	*Galerina* sp. "no ring" Gobblecannup	S			4	
107/132	*Galerina* sp. (*G. unicolor*?)	S		9		36
298	*Gymnopilus* sp. "Flybrook"	S			10	
248	*Gymnopilus* sp. (*G. austrosapineus*) "creamy yellow"	S			32	
ND 19	*Hygrophorus conicus*	S		2		
299	*Hypholoma australe*	S	8	33	6	9
177	*Inocybe australiensis* "brown wooly cap/flesh-coloured stem"	M	1	35	18	106
165	*Inocybe* sp. "white wooly cap/flesh coloured stem"	M		8		11
133/77	*Inocybe* sp. "peaked tomentose cap"	M		21	3	16
154	*Inocybe* sp. "split gill attachment"	M		16		14
120	*Inocybe* sp. "umbonate, fibrillose"	M	4		5	
172/58	*Inocybe* sp.	M	6	1		
188	*Inocybe* sp.	M	4			
277	*Inocybe* sp. "scaly cap/flesh stem - Gobblecannup"	M			23	
103	*Inocybe* sp. "umbonate scaly cap"	M		6		1
128/89	*Inocybe* sp. "water soaked gills"	M	796		370	
159	*Inocybe* sp. "grey-brown with white fibrils"	M		2	3	3
29	*Laccaria* sp	M	13			
155	*Laccaria* sp.	M		8	6	26
6	*Lactarius* sp.?	M	3			
42	LBM	?	1			
125	LBM "Laccaria-like, on bark at base of karri tree"	S		2		
164/79	LBM "olive gills"	S?		241		217
30/93/116	LBM "on soil, decurrent gills"	?	73			
25/03/17	*Lepiota cristata*	S		12		5
217	*Lepiota* sp. "creamy tan"	S				12
297	*Macrolepiota konradii*	S	1	2	1	7
27	*Marasmius crinisequi*	S		603		243
28	*Marasmius elegans*	S		215	1	147
243/199	*Marasmius* sp. "tan"	S	10		60	
92/16/85/47	*Marasmius* sp. LBM "karri bark 4, free rim"	S	3	224	7	404
134/223/19	*Marasmius* sp? "brown velvet - on leaves and bark on ground"	S		6	54	40
210	*Marasmius* sp. "2-4mm, white"	S				10
242a	*Marasmius* sp. "orange brown wheels on bark"	S			1	27
18	*Marasmius* sp. "orange-red"	S		37		2
212/80/207	*Marasmius alveolaris* "white-tan wheels"	S		470	29	1113
234	*Mycena* aff *subcapillaris*? (on leaf litter)	S			39	

APPENDIX 1…..cont.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
118/109	*Mycena* aff. *austrororida*	S		85		112
147/76	*Mycena* aff. *subgallericulata*?	S		20	7	21
121/50	*Mycena alcalina*	S		117	3	195
119/53	*Mycena pura*	S		7		12
229/91	*Mycena sanguinolenta*	S	1	1	39	
153/102/ 106/117	*Mycena* sp. "buff umbrella"	S		94		43
218	*Mycena* sp. "golden tan"	S				1
98	*Mycena* sp. "golden-buff"	S		1		
123	*Mycena* sp. "golden-orange"	S		22		13
287	*Mycena* sp. "omphaloid, orange"	S				18
146	*Mycena* sp. "tiny white scaly cap"	S		23	34	90
24/9	*Mycena* sp. "tiny white/yellow stem"	S		85		48
195	*Mycena* sp. "tiny, white/white/white"	S		3		
250	*Mycena* sp. "translucent white"	S				25
8	*Mycena* sp. "10mm, grey/white/dark grey"	S	2			
11	*Mycena* sp. "10mm, smokey grey-tan/tan-grey/dark brown"	S		12		
221	*Mycena* sp. "11-13mm, grey-brown/cream-grey/light brown-grey br"	S			23	
151	*Mycena* sp. "12mm, dark brown/smokey grey/grey brown to dark brown in lower portions"	S	2			
219	*Mycena* sp. "14-30mm, grey brown/smokey,/white-grey brown."	S			8	1
14	*Mycena* sp. "14mm, dark brown/creamy tan/dark brown"	S		1		
198	*Mycena* sp. "16-17mm, pinkish-buff/pinkish with red edge/ steely brown"	S		2		
4	*Mycena* sp. "25-35mm, dark brown/silver grey/silver brown"	S	32			
205	*Mycena* sp. "2.5mm grey-brown/smokey/grey-brown"	S			1	
170	*Mycena* sp. "21mm, brown/pinkish light brown/steely dark brown"	S	1			
232	*Mycena* sp. "2mm white/white (dec)/white, on soil"	S			45	1
213	*Mycena* sp. "3-4mm white/white/white"	S				1
157	*Mycena* sp. "3-4mm, creamy grey/light creamy grey/ brown"	S	2			
115	*Mycena* sp. "3-5mm, light grey/creamy grey/white to brown to dark brown at base"	S		4		
87	*Mycena* sp. "3-6mm, grey/whitish gr/eylight white-brown"	S		1		
211	*Mycena* sp. "3mm, tiny buff"	S			4	16
124	*Mycena* sp. "4.5-7mm, light brown/creamy white/ buff"	S		3		
13	*Mycena* sp. "4-13mm, light brown-grey/light brown-tan/steely dark brown"	S		10		
209	*Mycena* sp. "4-5mm, small buff"	S			28	32
214	*Mycena* sp. "4mm light brown-tan/buff/buff-dark brown"	S				1
97	*Mycena* sp. "4mm, brown/creamy white/creamy white to dark brown at base"	S		2		
245	*Mycena* sp. "5-9mm, buff(tan)/white/red brown to dark brown"	S			14	
186	*Mycena* sp. "5mm, brown/white/brown to grey near base"	S		1		
227	*Mycena* sp. "6-10mm, dark brown/creamy white/grey-brown, weak bleach odour"	S			3	3
233	*Mycena* sp. "6-15mm, light grey brown/dull white/white-brown grey, no odour"	S			25	
230	*Mycena* sp. "7-12mm, dark brown/grey/smokey-light grey, no odour"	S			45	
105	*Mycena* sp. "7-15mm, buff/buff/buff to light grey-brown at base, very weak bleach odour"	S		5		
135	*Mycena* sp. "7mm, dark brown/creamy buff/dark brown to light brown at base"	S		1		
57	*Mycena* sp. "8mm, brown-grey/smokey grey/steely brown"	S	1			

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
228	*Mycena* sp. "9-14mm, dark brown/dull white/white-grey, no odour"	S				3
84	*Mycena* sp. "9-15mm, dark brown/smokey/silver-white"	S		3		
226	*Mycena* sp. "9-17mm, grey-brown/light grey/grey- brown, bleach odour"	S			46	12
7/68/5	*Neolentinus dactyloides*	S	642			
99/201	*Omphalina* sp. "orange, brown scales"	?		3		9
100	*Omphalina* sp. "yellow-orange"	?		1		
290	*Omphalina* sp.	?				1
156	*Panellus ligulatus* "gilled, orange soft bracket"	S		14		65
168	*Pholiota* sp. "red-brown scales on cap and stem"	S		8		10
1/55/70	*Pleurotus* sp.	S	7			
270	*Pluteus attromarginata*	S			1	
194	*Pluteus lutescens*	S		1		15
204	*Pluteus* sp.	S			29	
94/65	*Psilocybe coprophila* "on 'roo dung"	S/C	26		51	
83	*Russula* sp "creamy white/creamy white/creamy white"	M		15		2
75	*Russula* sp. (*R.* aff. *adusta*?)	M		2		1
86	*Russula* sp. "grey-brown/creamy white/grey-brown"	M		4		
82	*Russula clelandii* "burgandy/white/pinkish stem"	M		4		7
131/101	*Tricholoma eucalypticum*	M	20	30	44	29
267	*Tricholoma* sp. "grey-white"	M				1
137/161	*Tricholoma* sp. "salmon-buff, scaly stem"	M		6		2
289	*Tubaria rufofulva*	S	3	18	2	36
258	*Xerula australis*	S				1
	Unidentifiable/Unknown		26	23	15	12
12	Unknown "White Spikes"	S		69		NC[2]
	CHANTERELLES					
268	*Cantharellus cibarius* var. *australiensis*	S/M?		73		4
	BOLETES					
319	*Boletellus ananiceps* "shaggy, blue staining bolete"	S?			1	
241	*Boletus* sp. "Creamy yellow red/yellow/yellow, flesh stains intense blue"	S/M?				4
46	*Boletus* sp. "purple-black"	S/M?		6		
252	*Paxillus* sp. "common yellow"	M			16	
220	*Paxillus* sp. "dark brown"	M			4	
10	*Paxillus* sp. "yellow, brown scales"	M		7	51	
	CORAL FUNGI					
78	*Clavicorona piperata*	S		2		33
266	*Clavulina* sp. "white"	S				2
96	*Clavulina amethystina* "mauve"	S		37		8
26	*Clavulina* sp. "creamy tan"	S		1		
95	*Clavulina* sp. "pink-buff"	S		181		125
176	*Clavulina* sp. "slender grey-brown"	S		40		10
144	*Clavulinopsis amoena* "yellow single clubs"	S		6	1	
114	*Clavulinopsis aurantia* "orange-yellow clubs"	S		66		21
126	*Clavulinopsis* sp. "grey-buff, simple or branched club"	S		3		
141	*Clavulinopsis* sp. "grey-white"	S		2	3	1
113a/113b	*Clavulinopsis* sp. "white clubs"	S		148		6
145	*Macrotyphula* aff. *junceus* "cream-white candles"	S		2		45

APPENDIX 1…..cont.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
282	*Ramaria* sp. "lemon-yellow"	M				1
225	*Ramaria ochraceosalmonicolor*	M	2		626	
169	*Ramaria* sp. "bright yellow"	M	1	4	1	3
43/127	*Ramaria* sp. "light yellow-brown"	M	12		3	
	GASTEROMYCETES					
276	Hypogean "light yellow"	M			2	
262	Hypogean "olive-yellow, white gleba with irregular convoluted locules"	M			1	
61	Hypogean "orange-brown gelatinous core"	M	2			
254	Hypogean "white, olive gleba"	M			8	
129	*Mesophellia* sp.	M	29		5	3
148	*Nidularales* sp. "bird nest fungi"	S	2			
224	*Scleroderma areolatum*	S			4	
	HYDNOID (SPINE) FUNGI					
178	*Hydnum* aff. *repandum*	M		1		
	JELLY FUNGI					
ND 25	*Calocera* sp. "yellow"	S		1		
273	*Heterotexus peziziformis*	S		8	2	26
286	Tremella "translucent white"	S			3	
ND 30	Tremella fuciformis	S		5		
ND 22	Tremella mesenterica	S		5		
	POLYPORES/THELEPHORES					
314/142	*Coltricia oblectans* "dark brown pores"	S		9	3	27
193	Coltricia sp. "miniature"	S	6			
285	*Hymenochaete* sp.	S			1	
ND 52	*Merulius* sp.	S		1		
291	*Piptoporus australiensis*	S		2		4
269	*Podoserpula pusio*	S				1
292	Polypore "hydnoid, brown resupinate"	S			1	
293	Polypore "white resupinate"	S				2
ND 8	Polypore "yellow/cream, resupinate"	S		1		
301	Polypore "beige, resupinate"	S		1		1
15	Polypore "creamy-yellow, soft"	S		82		62
272	Polypore "resupinate, hydnoid-ridged"	S				1
274	Polypore "resupinate, irregular elongated pores"	S		1		1
54	Polypore "toothed resupinate"	S	1			
206	Polypore "small velvet hoof"	S			30	
ND 2	*Polyporus mylittae*	S	3			
23	*Polyporus sclerotinus*	S	71		2	
ND 1	*Polyporus tumulosus*	S	25			
295	*Stereum hirsutum*	S		30		6
247	Thelephore "black, mauve margin"	S			9	
222	Thelephore (*Trichopatum* sp.?) "Hydnoid"	S			1	9
278	Thelephore "shallow merulioid"	S			1	
263	Thelephore "translucent salmon fan"	S				3
203	Trametes "brown zoned"	S		1		

APPENDIX 1…..cont.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
	ASCOMYCETES					
	CUP FUNGI					
112	*Aleuria rhenana* "stalked orange cup fungus"	S	9			
66/35	*Anthrocobia muelleri*	S	209		25	
304	Cup Fungus "khaki-olive"	S			11	
288	Cup Fungus "light orange, matted hairs"	S				2
60	Discomycete "lemon-yellow on bare soil"	S	109			
48	Discomycete "lemon-yellow on 'roo dung"	S/C		25		
33	Discomycete "lemon-yellow, on emu dung"	S/C	100			
303	Discomycete "yellow, stalked, on Podocarpus fruits"	S			66	
51	Discomycete "black, stalked"	S	15	105	57	167
251	Discomycete "cream, 2-3mm"	S				17
261	Discomycete "orange-yellow, 1-3mm"	S			71	
208	Discomycete "tiny orange"	S			6	
240	Discomycete "tiny yellow, stalked"	S			11	30
149/152	*Geopyxis* aff. *carbonaria*	S	355			
259	*Peziza* aff. *whitei*	M				1
21	**Peziza tenacella**	S	803			
31/39/69	Peziza (*P.* aff. *praetervisa*) "maroon/tan"	S	33			
22/71	*Peziza* aff. *petersii*	S	923			
38/63	Peziza (*P.* aff. *succosa*) "light brown/tan"	S	66			
40/36/37	Peziza (*P.* aff. *badia*) "brown-black/brown, pimples"	S	123		4	
191	Peziza (*P.* aff. *repanda*) "large brown cup on bark of karri"	S	3			
280/264	Peziza (aff. *Discina* sp.) "brown wrinkled"	S			2	6
196	Peziza "black/brown, tangled hairs"	S	815			
189/189b	Peziza (aff. *Nothojafnea*) "brown hairy cup fungus"	S		146		246
34	Peziza "brown/khaki"	S	4			
187	Peziza "creamy-white cup fungus"	S	2			
32	Peziza "dark brown/black"	S	10			
90	Peziza "dark maroon-br/br-khaki"	S	87			
260	Peziza "dark brown/brown" (same as 41?)	S			10	
41	Peziza "dark brown/buff"	S	272			
160	Peziza "dark brown-black, on rotton wood"	S	65			
66b/88	*Pulvinula archerii / Pulvinula* sp. "3mm orange, flat"	S	2245		686	
190	*Plectania* sp.	S		362		653
309	*Scutellinia* aff. *margaritacea* (*S. scutellata*)	S				13
	MORELS					
181	*Morchella elata*	S/M	152			
	EARTH TONGUES					
166	*Geoglossum* sp.	S		21		2
	PYRENOMYCETES (FLASK FUNGI)					
315	*Hyphomyces crysospermum* "white/yellow, on *Boletus* sp."	P				1
	(XYLARIACEOUS FUNGI)					
255	*Daldinia concentrica*	S	7		58	
312	*Hypoxylon* sp. "flat black, on karri sticks"	S		2		
313	*Hypoxylon* aff. *fuscum*	S				2
253	*Hypoxylon* aff. *rubiginosum* "flat purple"	S			1	2

APPENDIX 1…..cont.

Species ID No.	Species	Life Mode[1]	Number of Fruitbodies			
			1998		1999	
			Burnt	Unburnt	Burnt	Unburnt
318	*Hypoxylon* sp. "dull red-brown on Trymalium"	S				1
192	*Hypoxylon* sp. "erupting thru bark on *Acacia europhylla*"	S		12		9
294	*Xylaria hypoxylon*	S		1	22	234
56	Xylaria-like "small grey antlers"	S	106			
	(CORDYCEPS)					
239	Cordyceps (case moth cocoon)	P				2
256	Cordyceps "coral-like"	P			1	
	Total number of species		**72**	**123**	**98**	**123**
	MYXOMYCETES (SLIME MOULDS)					
ND 60	Myxomycete *Fuligo septica* (white/yellow)	B			4	1
ND 51	Myxomycete *Lycogala epidendrum*	B	1			
ND 68	Myxomycete "strawberry"	B				2
ND 69	Myxomycete "yellow heads"	B				90

[1] Life Mode: M = mycorrhizal, S = saprophytic, C = coprophilous, P = parasitic, B = bacteriaphore.
[2] NC = moderate numbers, but not counted.