Client report
to the Botanic Gardens and Parks Authority

BOTANIC GARDENS
& PARKS AUTHORITY

Fungi survey - Bold Park 2010

Author: Neale L. Bougher

Department of Environment and Conservation, Western Australia

Government of **Western Australia**
Department of **Environment and Conservation**

December 2010

In conjunction with the Perth Urban Bushland Fungi Project

Perth Urban Bushland Fungi

Western Australian Naturalists Club

lotterywest supported

Urban Bushland Council WA Inc

Figures 1 - 4: Examples of fungi discovered in Bold Park during 2010 that are new records for Western Australia. The species shown below are highlighted in the discussion section of this report.

Figure 1: *Botryobasidium subcoronatum* (BOUGHER 681)

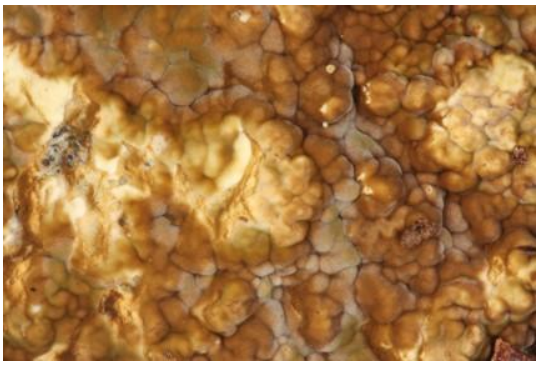


Figure 2: *Coniophora puteana* (BOUGHER 679)

Figure 3: *Phanerochaete tuberculata* (BOUGHER 641)

Figure 4: *Athelia* cf. *bombacina* (BOUGHER 622)

Fungi - Bold Park 2010

Background and Objectives

Bold Park is a regionally significant bushland located in the west metropolitan area of Perth, Western Australia. The park incorporates more than 400 hectares of diverse vegetation types on Spearwood and Quindalup dune systems such as eucalypt and banksias woodlands, acacia shrublands, and coastal and limestone heath (Keighery *et al*., 1990; Barrett and Tay, 2005). A large diversity of fungi occurs in Bold Park but little has been known about their identity or ecology. Many hundreds of species of microfungi, including some that benefit native orchids, occur in the park. In the first major study of fungi in the park and treatise of management issues for fungi in the park, 120 species of macrofungi were identified in the 14 vegetation types surveyed in Bold Park over a two month period in 1999 (Bougher 1999).

Subsequent annual surveys to build a baseline inventory of fungal diversity in Bold Park were carried out in 4 vegetation types in 2002, 2003, 2004 and 2005 (Bougher 2002 - 2005). These surveys were undertaken in line with performance indicator no. 8 of the Bold Park Environmental Management Plan 2000-2005 which required that "Known species richness of native fungal taxa (is) retained over five years" (Botanic Gardens & Parks Authority 2000). More recently, fungi have been included in the Bold Park Management Plan for 2006-2011 (Botanic Gardens & Parks Authority 2006) as part of ongoing goals to conserve and protect the local biodiversity at Bold Park. Three annual fungi surveys for the Bold Park MP 2006-2011 have been carried out in 4 vegetation types in 2007 and 2008 and in 14 vegetation types in 2009 (Bougher 2007, 2008, 2009).

To date (prior to 2010), about 437 fungi species have been recorded in the Park. A summary table of fungal biodiversity data for Bold Park has been posted on the Perth Urban Bushland Fungi web site at www.fungiperth.org.au. It is likely that surveys so far have captured only a fraction of the fungi likely to exist in Bold Park. Fungi produce fruit bodies intermittently and unpredictably but the mycelia of each fungus may be active for long periods of each year. It is necessary to survey fruit bodies at the same location over many years if such data is to be used as an accurate measure of fungal diversity.

The current consultancy in 2010 undertook the fourth annual fungi survey for the Bold Park Management Plan 2006-2011. This survey addressed the following requirements for fungi relating to the current Bold Park MP performance criteria:

1. Field survey
- Inventory of fungi fruiting at scheduled survey (including native & exotic, rare & endangered).
- Identity and description (key attributes) of species observed.
- Permanent reference resource of selected specimens.

2. Report
- Inventory and location of fungi observed during the current survey, identified to genus or species level, based on current survey: including possible designation as native and exotic, rare and endangered, beneficial, disease.
- Known vegetation and plant associations of fungal species obtained.

Methods

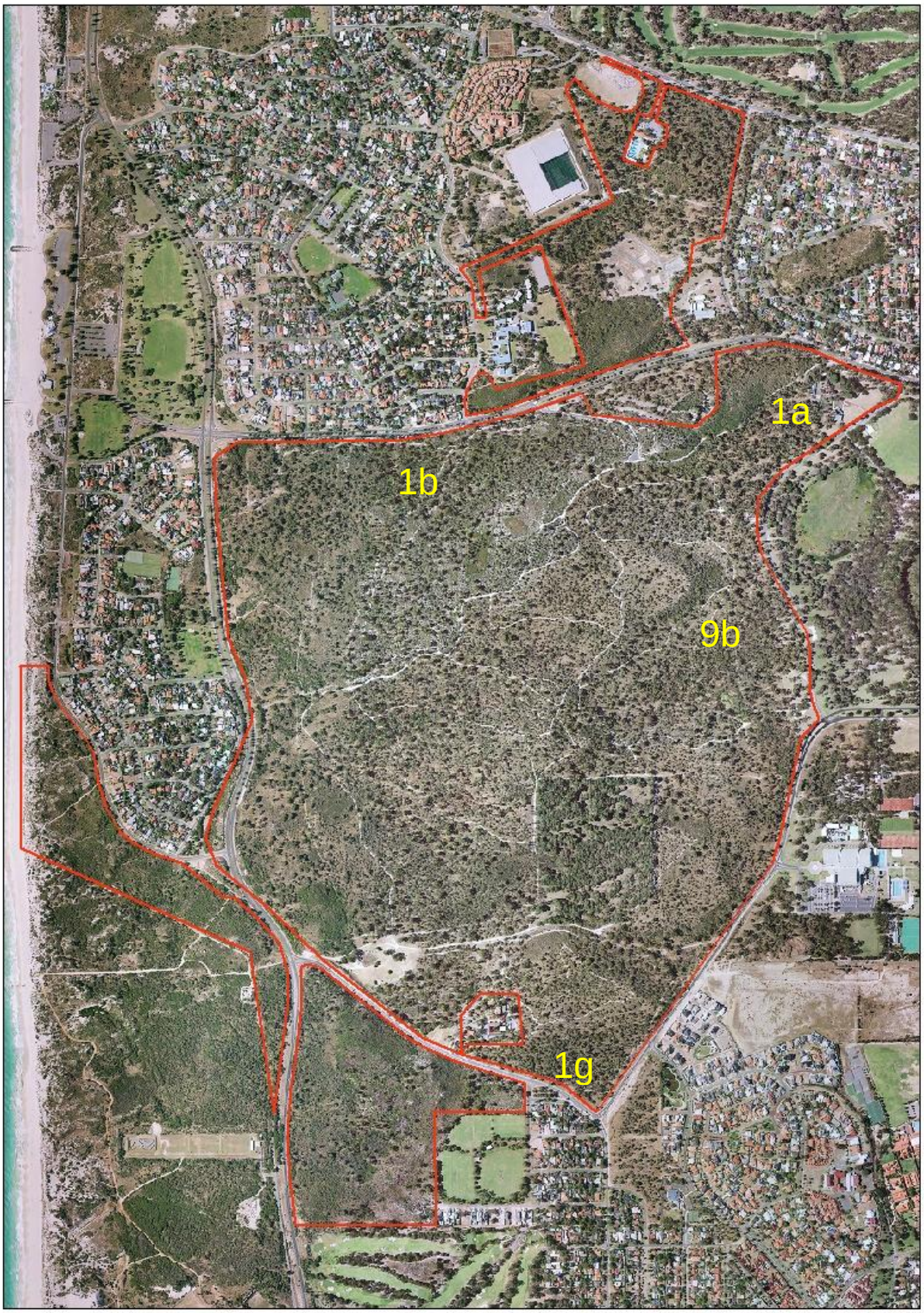
Fungi were collected in Bold Park from early June to the end of July 2010. Four vegetation types in Bold Park were surveyed for macrofungi (Table 1, Map 1). The surveys within the vegetation types were measured by a person x time basis – approximately 60 person time minutes per site each survey time. The number and intensity of surveys were dictated by weather conditions and limitations imposed by the consultancy contract. During collecting, particular attention was given to many of the main fungal microhabitats including open and mossy ground, litter, woody debris and logs, bark of living trees. Specific vegetation or plant associations of fungi were noted. Fungi were identified to genus or species level by constructing morphological descriptions of the fungi collected, and examining key microscopic characteristics of specimens. Identifying fungi is often more complicated than identifying plants, as there are no complete keys to the Australian fungi (such as Blackall & Grieve for the W.A. plants) to refer to. There are very few guidebooks, and they are far from complete in coverage, and in many cases quite inaccurate. A range of resources were utilized for identification: direct comparisons of macro and micro characters between Bold Park material and identified reference herbarium material (PERTH – Western Australian Herbarium), comparison with published mycological literature, and more generally by utilizing the author's own experience, knowledge and records. Identification enabled: (a) assessment of probable broad ecological roles of the fungi in community sustainability, (b) designation of fungi as native and exotic, and (c) a database of inventory data obtained for Bold Park comparable to available data of other tuart/banksia woodland bushland areas. All of the fungi collected were photographed and preserved as

air-dried, coded herbarium voucher material lodged at the Department of Environment and Conservation's Western Australian Herbarium, Kensington (PERTH).

Table 1: Vegetation and plant community types surveyed for fungi, and number of sampling times for each type. Surveys undertaken during current consultancy indicated in blue, with sampling times in 2010 indicated. Surveys indicated in black were undertaken in the initial 1999 survey (Bougher, 1999).

Vegetation code	Plant communities	Surveys 1999 + 2010 survey
Eucalypt Woodlands over Shrublands		
1a	Woodland of Eucalyptus gomphocephala over a variable understorey on grey sand	5 + 1
1b	Woodland of Eucalyptus gomphocephala over an understorey dominated by Allocasuarina humilis on grey sand	1 + 2
1d	Open woodland of Eucalyptus gomphocephala, with occasional Banksia attenuata and B. menziesii, over shrubs dominated by Macrozamia riedlei, Xanthorrhoea preissii, Acacia rostellifera, and Jacksonia spp. on grey sand	2
1a	Woodland of Corymbia calophylla, with occasional Eucalyptus gomphocephala, and Banksia spp., over tall shrubs on grey sand	4
1f	Woodland of Eucalyptus marginata and Corymbia calophylla over a variable, often disturbed understorey on grey sand	4
1g	Woodland to Open Woodland of Eucalyptus marginata over a variable understorey on grey sand	4 + 1
1h	Woodland of Eucalyptus decipiens over Melaleuca acerosa, Hardenbergia comptoniana, Xanthorrhoea preissii and mixed low shrubs and herbs on pale grey sand	5
Open Eucalypt Woodlands over Heath		
2a	Open Woodland of Eucalyptus gomphocephala over low to medium shrubs generally associated with heath communities, on grey sand	2
Woodlands dominated by Banksia		
4a	Woodland of Banksia attenuata and Banksia menziesii, with emergent Eucalyptus gomphocephala, over a variable understorey on grey sand	2
Shrublands		
5a	Closed shrubland of Acacia rostellifera over mixed shrubs and herbs on pale grey sand	2
5b	Closed shrubland of Acacia xanthina over mixed shrubs and herbs on pale grey sand, often underlain with limestone	1
Wetlands and drainage lines		
9b	Woodland of Eucalyptus rudis on brown sandy-loam on fringes of Camel Lake	5 + 1
Modified areas		
D	Disturbed ground (including Skyline site)	6
P	Pine plantation - mainly Pinus pinaster, some Pinus radiata	1

Map 1: Sites surveyed for fungi at Bold Park in 2010



Results

A total of 83 species of fungi were obtained in 2010 during the period of this consultancy. The fungi represent 66 genera and 42 families (+ 3 species were unidentified and therefore genera and families unknown) (Table 2). All species are considered to be indigenous except 3 species designated as exotic (introduced from outside Western Australia): *Inocybe rufuloides* (now identified for the first time in Australia), *Rhizopogon roseolus*, and *Suillus collinitus* which are mycorrhizal associates of *Pinus*. Detailed data for the fungal collections from 2010 that were vouchered for permanent reference are given in Appendix 1.

- 19% of the current survey fungi (16 species) are considered to be new records for Bold Park.
- 81% of the fungi (67 species) in the current survey are considered to be the same as the species recorded in the previous surveys (Bougher 1999, 2002 - 2005, 2007 - 2009).
- 9 new records for Western Australia discovered at Bold Park in 2010 are: *Amaurodon*-like sp., *Athelia cf. bombacina, Botryobasidium subcoronatum, Coniophora puteana*, *Inocybe rufuloides*, *Peniophora cinerea*, *Phanerochaete tuberculata*, *Physarum polycephalum*, and *Propolis versicolor*.
- *Athelia cf. bombacina* and *Inocybe rufuloides* are new records for Australia.
- Saprotrophic fungi (67 species) were more diverse than mycorrhizal fungi (9) and pathogenic fungi (6) (Table 3). Fungi were present in a wide range of vegetation and microhabitat types. Dead wood with 47 species, and leaf litter with 23 species, had the greatest diversity of fungi (Table 3).

Table 2: Identity and some ecological characteristics of fungal species in Bold Park 2010 (arranged in order of genus, species). **Red/brown = new records of species for Bold Park found during 2010.**

Ecology/Life modes: S = saprotrophic; P = pathogenic; M = mycorrhizal. *Microhabitat types:* A = on animal; B = bark of living tree; L = leaf litter, soil; DT = diseased or dying tree; DW = dead wood; D= on dung/faeces; MB = moss on bark of living tree; MG = moss on ground; U = underground.

Species	Family	Ecology Life Mode	Habitat	Woody Plant Association	Exotic / Native	Voucher Code	Veg. Type
1. *Amanita sp. 1* – *long white narrow stem, fragile annulus, no bulb, white pileus*	Amanitaceae	M	L	*E. gomphocephala*	N		1b
2. *Amanita xanthocephala*	Amanitaceae	M	L	*E. gomphocephala*	N		1b
3. *Amaurodon- like*	Thelephoraceae	S	B	*E. marginata*	N		1g
4. *Arachnopeziza aurata*	Pezizaceae	S	DW	*E. gomphocephala*	N	BOUGHER 00654	1b
5. *Ascomycete (sp. 2 – 2008)* *gelatinous minute blobs*	Undetermined	S	DW	*Macrozamia*	N		1g
6. *Athelia cf. bombacina*	Atheliaceae	S	DW	*Xanthorrhoea pressii*	N	BOUGHER 00622	1a
7. *Banksiamyces sp.* – *bluish-grey, white rim*	Leotiaceae	S	DW	*Banksia*	N	BOUGHER 00697	1b
8. *Bisporella citrina*	Helotiaceae	S	L	*E. gomphocephala*	N		1b
9. *Bolbitius vitellinus*	Bolbitiaceae	S	L/DW	*E. gomphocephala, woodchips*	N/E?		1a
10. *Botryobasidium subcoronatum*	Thelephoraceae	S	DW	*E. marginata*	N	BOUGHER 00681, 00682	1g
11. *Bovista cf. apedicellata*	Lycoperdaceae	S	L	*E. gomphocephala*	N		1b
12. *Byssomerulius corium*	Corticiaceae	S	DW	*E. gomphocephala*	N		1g
13. *Campanella gregaria*	Marasmiaceae	S	DW	*Banksia menziesii*	N		1a
14. *Ceratiomyxa fruticulosa*	Ceratiomyxaceae	S	DW	*E. gomphocephala*	N		1a
15. *Ceriporiopsis sp.* *cream*	Halosphaeriaceae	S	DW	*E. rudis*	N	BOUGHER 00643	9b
16. *Clavulina vinaceocervina*	Clavulinaceae	M	L	*E. marginata*	N	BOUGHER 00678	1g
17. *Clitocybe semiocculata*	Tricholomataceae	S	DW	*E. gomphocephala*	N		1a, 1b

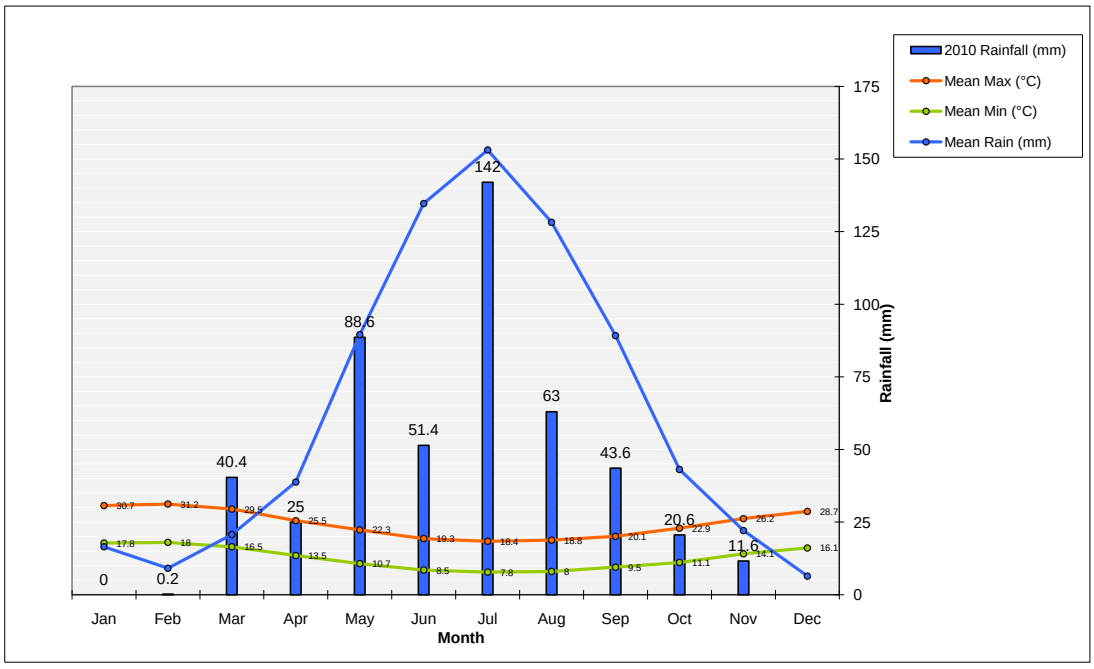
Species	Family	Ecology Life Mode	Habitat	Woody Plant Association	Exotic / Native	Voucher Code	Veg. Type
18. ***Clitocybe semiocculta***	Tricholomataceae	S	DW	*E. gomphocephala*	N		1a
19. ***Clitopilus hobsonii***	Tricholomataceae	S	DW/L	*E. gomphocephala, E. rudis*	N	BOUGHER 00640	1a, 1b, 9b
20. ***Coltricia cinnamomea***	Hymenochaetaceae	S	L	*E. marginata*	N		1g
21. ***Coniophora puteana***	Coniophoraceae	S	DW	*Banksia attenuata*	N	BOUGHER 00679	1g
22. ***Coprinellus angulatus***	Psathyrellaceae	S	L	*E. gomphocephala*	N	BOUGHER 00693	1b
23. ***Coprinopsis stanglianus***	Psathyrellaceae	S	L	*E. gomphocephala, Banksia spp.*	N		1b
24. ***Cortinarius ochraceofulvus***	Cortinariaceae	M	L	*E. gomphocephala, Banksia spp.*	N		1b
25. ***Cortinarius sp. 1*** – *golden orange pileus*	Cortinariaceae	M	L	*E. gomphocephala, Banksia spp.*	N		1b
26. ***Crepidotus eucalyptorum***	Crepidotaceae	S	DW	*E. gomphocephala, E. rudis*	N	BOUGHER 00621	1a, 1b, 9b
27. ***Crepidotus mollis***	Crepidotaceae	S	DW	*E. gomphocephala*	N		1a
28. ***Crepidotus sp. A 2008***	Crepidotaceae	S	DW	*E. gomphocephala*	N		1b
29. ***Dasyscyphus sp.***	Hyaloscyphaceae	S	DW	*E. marginata*	N		1g
30. ***Exidia glandulosa***	Exidiaceae	S	DW	*E. gomphocephala*	N		1b
31. ***Fomitopsis lilacinogilva***	Polyporaceae	S	DW	*Acacia sp.*	N		1a
32. ***Galerina marginata***	Cortinariaceae	S	DW	*Banksia sp., Macrozamia*	N	BOUGHER 00676	1a, 1b
33. ***Geastrum sp.***	Geastraceae	S	L	*E. gomphocephala*	N	BOUGHER 00624	1a
34. ***Glomus / Endogone sp.***	Glomeraceae	M	U	*E. marginata*	N		1g
35. ***Grandinia sp.***	Corticiaceae	S	DW	*E. rudis*	N	BOUGHER 00642	9b
36. ***Gymnopilus allantopus***	Cortinariaceae	S	DW	*Banksia sp.*	N		1a, 1b, 1g
37. ***Gymnopilus perplexus***	Cortinariaceae	S	DW	*Banksia sp.*	N		1g
38. ***Gymnopus sp.*** *dark stem caramel cap*	Tricholomataceae	S	L	*E. marginata*	N	BOUGHER 00675	1g
39. ***Harknessia uromycoides***	Melanconidaceae	S	DW	*E. gomphocephala*	N		1b
40. ***Hemimycena sp.*** *minute, fragile, white pileus, arcuate gills, on wood*	Tricholomataceae	S	L	*E. rudis*	N		9b
41. ***Henningsomyces candidus***	Schizophyllaceae	S	DW	*E. marginata*	N		1g
42. ***Hohenbuehelia bingarra***	Tricholomataceae	S	DW	*Banksia attenuata*	N		1g
43. ***Hyphodontia sp.*** spiky warts	Hyphodermaceae	S	DW	*E. gomphocephala*	N	BOUGHER 00700	1b
44. ***Hypochnicium-like***	Hyphodermaceae	S	L	*Astroloma pallidum, E. marginata*	N	BOUGHER 00677	1g
45. ***Hypoxolon fuscum***	Xylariaceae	S	DW	*E. gomphocephala*	N		1b
46. ***Inocybe rufuloides*** *(formerly listed as Inocybe sp. pines)*	Inocybaceae	M	L	*Pinus radiata*	E	BOUGHER 006818	P
47. ***Junghuhnia sp.-*** *cream with orange stains*	Meruliaceae	S	DW	*E. gomphocephala*	N	BOUGHER 00702	1b
48. ***Laetiporus portentosus***	Coriolaceae	P	DT	*E. gomphocephala*	N		1a
49. ***Lentinellus pulvinulus***	Lentinellaceae	S	B	*E. gomphocephala*	N		1a
50. ***Mycena kuurkacea***	Tricholomataceae	S	L	*E. marginata*	N		1g
51. ***Mycena nargan***	Tricholomataceae	S	DW	*Banksia sp., E. rudis*	N		1a, 9b
52. ***Mycena sp. 6*** – *minute, white* ***pileus*** *deep in litter*	Tricholomataceae	S	L	*E. gomphocephala*	N		1a
53. ***Mycena sp. D*** – *small,*	Tricholomataceae	S	L	*E. calophylla, E.gomphocephala*	N		1b, 9b

Species	Family	Ecology Life Mode	Habitat	Woody Plant Association	Exotic / Native	Voucher Code	Veg. Type
wiry stipe, buried in litter							
54. ***Mycena sp****. fawn cap on wood*	Tricholomataceae	S	DW	*E. gomphocephala,*	**N**		**1a**
55. ***Mycena sp.*** grey cap, hairy base on wood	Tricholomataceae	S	DW	*E. marginata*	**N**		**1g**
56. ***Mycena sp.*** *yellow cap, strigose base, on wood*	Tricholomataceae	S	DW	*E. gomphocephala*	**N**		**1b**
57. ***Omphalotus nidiformis***	Paxillaceae	P	DT/DW	*E. gomphocephala*	**N**		**1a, 1b**
58. ***Peniophora cinerea***	Corticiaceae	S	DW	*E. gomphocephala*	**N**	**BOUGHER 00696**	**1b**
59. ***Peniophora sp****. grey felty*	Corticiaceae	S	DW	*Banksia sp.*	**N**		**1b**
60. ***Peziza sp. 4*** *grey discs on wood*	Pezizaceae	S	DW	*E. gomphocephala*	**N**	**BOUGHER 00623**	**1a**
61. ***Phanerochaete tuberculata***	Meruliaceae	S	DW	*E. rudis*	**N**	**BOUGHER 00641**	**9b**
62. ***Phlebia rufa***	Meruliaceae	S	B	*E. gomphocephala*	**N**	**BOUGHER 00655 , 00695**	**1b**
63. ***Phlebia subceracea***	Meruliaceae	S	DW	*Banksia sp.*	**N**		**1a**
64. ***Physarum polycephalum*** *(slime mould)*	Physariaceae	S	L	*E. gomphocephala*	**N**		**1b**
Piptoporus australiensis	Coriolaceae	P	DT	*E. gomphocephala*	**N**		**1a**
65. ***Pleuroflammula praestans*** *(formerly listed as Pleuroflammula sp.)*	Strophariaceae	S	DW	*E. gomphocephala*	**N**	**BOUGHER 00653**	**1b**
66. ***Poria sp.*** *white resupinate*	Polyporaceae	S	DW	*E. gomphocephala*	**N**		**1b**
67. ***Propolis versicolor***	Rhytismataceae	S	DW	*E. rudis*	**N**		**9b**
68. ***Psathyrella sp. 2***	Psathyrellaceae	S	L	*E. gomphocephala*	**N**		**1b**
69. ***Psilocybe coprophila***	Strophariaceae	S	D	*E. gomphocephala*	**N**		**1b**
70. ***Resupinate Undetermined # 2*** *spreading, large-spored*	Undetermined	S	DW	*E. gomphocephala*	**N**		**1b, 9b**
71. ***Resupinatus subapplicatus***	Tricholomataceae	S	DW	*Acacia sp., E. marginata, E. gomphocephala*	**N**		**1a, 1b, 1g**
72. ***Rhizopogon roseolus***	Rhizopogonaceae	M	U	*Pinus pinaster*	**E**		**P**
73. ***Rickenella fibula***	Tricholomataceae	S	MG	*E. marginata*	**N**		**1g**
74. ***Rosellinia sp.***	Xylariaceae	S	DW	*E. gomphocephala*	**N**	**BOUGHER 00701**	**1b, 1g**
75. ***Royoporus badius***	Polyporaceae	S	B	*E. gomphocephala, E. rudis*	**N**		**1a, 1b, 9b**
76. ***Schizopora paradoxa***	Polyporaceae	S	DW	*Banksia sp., E. gomphocephala*	**N**	**BOUGHER 00625**	**1a, 1b, 9b**
77. ***Scleroderma cepa***	Sclerodermataceae	M	L	*Corymbia calophylla*	**N**		**9b**
78. ***Stereum illudens***	Stereaceae	S	DW	*E. gomphocephala*	**N**		**1g**
79. ***Suillus collinitus***	Boletaceae	M	L	*Pinus radiata*	**E**		**P**
80. ***Tremella mesenterica/aurantia***	Tremellaceae	P	DW	*Acacia pulchella*	**N**		**1b**
81. ***Tubulicrinis sp.*** *– grey resupinate*	Tubulicrinaceae	S	DW	*E. rudis*	**N**	**E8040 BOUGHER 00425 E9274 BOUGHER 00644**	**9b**
82. ***Undetermined anamorphic fungus***	Undetermined	P	A	*E. gomphocephala*	**N**	**BOUGHER 00703**	**1b**
83. ***Volvariella speciosa***	Pluteaceae	S	L	*E. gomphocephala*	**N/E?**		**1a**

Table 3: Taxonomic rank, life mode, habitat, and vegetation associations of fungi in Bold Park in 2010.
Note: some fungi may have more than one life-mode type, and modes for most have not been confirmed.

Category	No. species	Example species
Taxonomic ranks		
Species	82	-
Genera	66	-
Families	*42 (+ 3 of unknown family)*	
Ecology/Lifemode types		
Saprotrophic	67	*Clitopilus hobsonii*
Pathogenic	6	*Piptoporus australiensis*
Mycorrhizal	10	*Amanita xanthocephala*
Main habitat types		
leaf litter	24	*Coprinellus angulatus*
diseased or dying tree	3	*Piptoporus australiensis*
dead wood	47	*Botryobasdium subcoronatum*
bark of living tree	4	*Lentinellus pulvinulus*
moss on ground	1	*Rickenella fibula*
underground	2	*Glomus / Endogone sp.*
dung	1	*Psilocybe coprophila*
on animal	1	*Undet. Anamorphic fungus on millipedes*
Vegetation types		
1a	16 exclusive / 10 shared	*Phlebia subceracea*
1b	27 / 12	*Arachnopeziza aurata*
1g	18 / 1	*Clavulina vinaceocervina*
9b	7 / 2	*Phanerochaete tuberculata*
P	3 / 0	*Inocybe rufuloides*
Origin		
Native	80	*Campanella gregaria*
Exotic	3	*Rhizopogon roseolus*

Chart 1: Rainfall for Perth in 2010 compared with the long-term average.



Discussion

Biodiversity

An estimated total of 461 species of fungi are currently recorded from Bold Park. This includes 16 of the fungi in the current survey considered as new records for Bold Park – 19% of the 83 fungi recorded in 2010.

A dry winter in Perth (see Chart 1, above) undoubtedly reduced the fruiting of fungi at Bold Park in 2010. Well below average rainfall in the month of June would have had a major effect. In the Perth region the development and production of fruit bodies by a large majority of macrofungi usually reaches a peak in June or early July. At Bold Park in 2010 it was evident that the fruiting of fleshy mushroom-like species was greatly reduced, including species that occur on banksia logs which usually become saturated by the end of June.

The identity of some of the species that were listed under other names in previous years have been determined in 2010, such as *Bovista cf. apedicellata* (formerly listed as *Bovista sp.*), *Clitopilus hobsonii (formerly as Crepidotus sp. tiny white fans, and as Marasmiellus sp. 1*), *Galerina marginata* (formerly as *Galerina cf. autumnalis - pale on wood), Gymnopilus perplexus* (formerly as *G. cf. perplexus*), *Hemimycena sp. minute, fragile, white pileus, arcuate gills, on wood* (formerly as *Mycena sp. minute, fragile, white pileus, arcuate gills, on wood*), *and Rosellinia sp.* (formerly as *Hypoxylon sp. crowded pustules*).

In addition, the exotic species *Inocybe rufuloides* was identified for the first time in 2010. Previously it had been recorded as "*Inocybe sp. pines*" from under pines near the WA Ecology Centre in 2008 (BOUGHER 479), and from the central pine plantation at Bold Park in 2009 (BOUGHER 541). *I. rufuloides* has not been recorded elsewhere in Australia.

An unidentified fungus labeled as "*Undetermined agaric (tiny, adorned with bubbles, cream-spored, on wood)"* collected at Bold Park in 2009 on moist, well-rotted wood of *Melaleuca huegelii* Endl., in shrubland of *Acacia* and paperbark near the northern base of Reabold Hill has now been determined as *Hemimycena cephalotricha* – a species which was previously unrecorded in Australia. Details of this new discovery were published earlier this year (Bougher 2010a). *Hemimycena cephalotricha* is quite striking when observed under a hand lens as the cap and stem are often bejewelled with refractive water droplets (Figure 5).

A fungus previously labeled as "*Hymenoscyphus sp. 1 brown funnels* (formerly listed as *Hymenoscyphus* sp.)*"* collected at Bold Park in 2004 and 2009 (but not seen in 2010), has now been identified as a species of *Lanzia*. This fungus has now been also collected at Kings Park in 2009 and 2010. It does not match any of the six lignicolous (wood-inhabiting) species of *Lanzia* recorded so far in Australia. See Bougher (2010b) for discussion and images of this fungus referred to there as *Lanzia sp. funnel, scurfy stem*.

Figure 5: *Hemimycena cephalotricha* from Bold Park – first record for Australia

Some of the new and interesting fungi in 2010: Four of the resupinate species

1. *Botryobasidium subcoronatum* (Figure 1, see on page 2): This may be a quite widespread resupinate (skin or crust) fungus in Perth's urban bushlands but so far the only other record of this species in Western Australia is from the bark of *Melaleuca* at Rockingham Lakes. This fungus has only been found locally on the inside surface of bark still attached to trees, and therefore it may be easily overlooked. At Bold Park in 2010 *B. subcoronatum* was found in two separate locations on bark clinging to the base of *Eucalyptus marginata*. This fungus produces rather diffuse white to pale cream growths and macroscopically is difficult to distinguish from a range of other fungi with similar form. However microscopically *B. subcoronatum* can be recognized by its fusoid-amygdaliform spores, absence of any cystidia, monomitic hyphal system with clamp connections on all septa, and 6-spored broadly cylindric basidia. So far at Bold Park it has only been found in jarrah woodland.

2. *Coniophora puteana* (Figure 2): This is another resupinate fungus from the jarrah woodland at Bold Park. It had not been recorded before in Western Australia. In contrast to the rather hidden *Botryobasidium subcoronatum*, this fungus was found as an extensive spreading growth on the trunk surface of a dead standing *Banksia attenuata* tree. This species is fully resupinate, dull olive-brown, with a very minutely velvety and dry surface forming low cushions in some parts. The margin is fringed with white mycelium, and the fruit bodies have large areas of immature hymenium which are pale cream to white. Microscopically, the presence of long basidia which project well beyond the hymenium, smaller cystidia, large golden ovoid thick-walled spores yielding a brown spore deposit, absence of clamp connections, and a monomitic hyphal system all point to this being genus *Coniophora*. It matches the species *C. puteana* (= Cunningham's *C. olivacea*).

3. *Phanerochaete tuberculata* (Figure 3): This is another resupinate species not previously recorded in Western Australia. Under a hand lens the finely velvety and glistening surface of this fungus is visible. Its margin is white, cottony thick, and sometimes effused-reflexed (margin turning upwards). It becomes coriaceous (tough texture) upon drying, and is firmly attached to the woody substrate. Unlike some other species of *Phanerochaete*, this species does not have any rhizomorphs. Microscopically, all tissues are hyaline with oily globules throughout, cylindric to slender clavate oily cystidia are present, clamps are present in the hymenium, and the hyphal system is monomitic.

4. *Athelia* cf. *bombacina* (Figure 4):
This fungus found on dead *Xanthorrhoea* fronds in tuart woodland near Reabold Hill produces a yellowish cream, thin, easily removed, spreading growth with a diffuse and undifferentiated margin. It fits the genus *Athelia* by virtue of its cobwebby thin and esily removed fruit body, loose hymenium with basidia in separate bundles, and narrow clamped hyphae in the hymenium. It may be closest to *A. bombacina* but the Bold Park specimen differs from that species by having slightly smaller spores and the presence of moniliniform/constricted cystidia. *Athelia bombacina* has not been previously recorded in Australia.

Conclusion and recommendations

A total of 461 putative species of fungi have been recorded at Bold Park, and a sustained accumulation of new records each survey year indicates that many more species are likely to occur in the Park. It is recommended that surveys of fungi continue to be undertaken annually in Bold Park, including with continuing support from staff and volunteers. Further training of volunteers and staff is recommended in order to recognize a greater array of fungi, particularly the less conspicuous types of fungi. The support of DEC's Western Australian Herbarium will be critical to help facilitate taxonomic studies needed to resolve the identity of more of the records of fungi from Bold Park. This will help provide a more accurate assessment of the numbers of fungi species present at Bold Park. Resolution of the identity of fungi at Bold Park would be accelerated if financial support targeted for taxonomic studies became available.

Ongoing protection and improvement of knowledge about Flora, Fauna and Fungi is an integral part of future management of Bold Park (Botanic Gardens & Parks Authority 2006). Continuing annual surveys of fungi at Bold Park will enable the goals as set out in the 2006-2011 management plan to be met. Surveys will also supplement the Perth Urban Bushland Project (PUBF) established in 2004 (see www.fungiperth.org.au) – a broader-based initiative which aims to raise awareness about fungal biodiversity, and to document the fungi of Perth's urban bushlands. Some of the fungi recorded so far in Bold Park are depicted in the on-line field book for fungi of the Perth region (Bougher 2009b). However it is recommended that an account of the fungi in Bold Park be produced, such as a colourful field book and/or pamphlets and posters.

Acknowledgements

Thanks to the following 10 volunteers who donated their time and efforts to participate as members of the "collecting crew" for one or more of the fungi surveys days in 2010: Peter Broome, Elaine Davison, Peter Davison, Alicia Dyson, Patricia Gurry, Jonica Foss, Joe Froudist, Kay Rae, Phylis Robertson, and Pat Wenham. Three BGPA staff – Chris Swarts, Ben Nuske, Marcello Campisi - also assisted in the field on at least one of the survey days. Steve Easton (BGPA) assisted by encouraging participation by BGPA staff and by proofing drafts of this report. Dr Elaine Davison (Curtin University) and Peter Davison also assisted further by examining specimens of slime moulds and *Amanita* and determining their identification when possible.

Valuable technical and general support was provided by staff and volunteer members of the Perth Urban Bushland Fungi project team - Roz Hart, Aruni Jayasekera, and Brett Glossop. Perth Urban Bushland Fungi is a collaborative project between the WA Naturalists' Club and the Urban Bushland Council in conjunction with the Department of Environment and Conservation's WA Herbarium.

References quoted

Barrett, R.L., and Tay, E.P. (2005). Perth Plants. A field guide to the bushland and coastal flora of Kings Park and Bold Park, Perth, Western Australia. Botanic Gardens and Parks Authority., Perth, Western Australia.

Botanic Gardens & Parks Authority (2000). Bold Park Environmental Management 2002-2005. ISBN 1876479035.

Botanic Gardens & Parks Authority (2006). Bold Park Management Plan 2006-2011.

Bougher, N.L. (1999). Environmental Management of Bold Park, Western Australia: Urban Bushland Fungi. CSIRO Report to the Botanic Gardens and Parks Authority.

Bougher, N.L. (2002). Fungi survey Bold Park 2002. CSIRO Report to the Botanic Gardens and Parks Authority.

Bougher, N.L. (2003). Fungi survey Bold Park 2003. CSIRO Report to the Botanic Gardens and Parks Authority.

Bougher, N.L. (2004). Fungi survey Bold Park 2004. Perth Urban Bushland Fungi (PUBF) Report to the Botanic Gardens & Parks Authority.

Bougher, N.L. (2005). Fungi survey Bold Park 2005. Perth Urban Bushland Fungi (PUBF) Report to the Botanic Gardens & Parks Authority.

Bougher, N.L. (2007). Fungi survey Bold Park 2007. Perth Urban Bushland Fungi (PUBF) Report to the Botanic Gardens & Parks Authority.

Bougher, N.L. (2008). Fungi survey Bold Park 2008. Perth Urban Bushland Fungi (PUBF) Report to the Botanic Gardens & Parks Authority.

Bougher, N.L. (2009). Fungi survey Bold Park 2009. Perth Urban Bushland Fungi (PUBF) Report to the Botanic Gardens & Parks Authority.

Bougher, N.L. (2009b). Fungi of the Perth Region and Beyond. Perth Urban Bushland Fungi, Perth, Western Australia. Western Australian Naturalists Club (Inc.), Perth, Western Australia. (Also at www.fungiperth.org.au).

Bougher, N.L. (2010a). First record for Australia of the wood-inhabiting fungus *Hemimycena cephalotricha*: from urban bushland in Perth, Western Australia. *Western Australian Naturalist* 27: 91-98.

Bougher (2010b). Fungi survey 2010 – Kings Park and Botanic Garden. Cleint Report to the Botanic Gardens & Parks Authority.

Keighery, G.J., Harvey, J., and Keighery, B.J. (1990). Vegetation and flora of Bold Park, Perth. The West Australian Naturalist 18:100-122.

Perth Urban Bushland Fungi (est. 2005). On line resource at www.fungiperth.org.au

Appendix 1

The subset of fungi that were processed, described, & lodged as herbarium vouchers from Bold Park 2010: Western Australian Herbarium (PERTH), Kensington

Genus	*Species*	Code	Descriptive Notes	*Plants*	Date
Amaurodon-like	*sp.*	BOUGHER 00680	Characteristic Features: Velvety texture and purple colour when fresh, developing a whitish felt or bloom in parts. Fully resupinate. Irregular spreading shape up to 35 x 50 mm, velvety to touch. Easily removed from the substrate. Hymenium dark purple to grey in the middle when fresh, but dries out to a dark charcoal colour on the margin. Appears to be felty in the grey areas and matted-fibrous in the darker areas. Subiculum absent. Margin pale with spidery fibres.	*Eucalyptus marginata, Macrozamia reidlei*	15/07/2010
Arachnopeziza	*aurata*	BOUGHER 00654	Characteristic Features: (i) minute flat discs less than 1mm diam.; (ii) cream then later tan with fine short white hairs at rim; (iii) sparse appressed whitish subiculum inbetween the discs. Micro: Spores cylindric, narrower at one end and sometimes curved, 7-septate, e.g. 46 x 4 microns. Asci with amyloid mucronate apex. Paraphyses branched, narrow, sparesly septate.	*Eucalyptus gomphocephala, Allocasuarina humilis*	1/06/2010
Athelia	*cf. bombacina*	BOUGHER 00622	Characteristic Features: (i) smooth to farinose surface; (ii) thin, easily removed, spreading growth with diffuse and undifferentiated margin; (iii) colour yellowish cream (near Methuen 3B2 to 4B2). This appears to fit genus Athelia by virtue of loose hymenium with basidia in separate bundles, cobwebby thin and esily removed fruit body, narrow clamped hyphae in hymenium. May be closest to A. bombacina but BOUGHER622 differs from that species by having slightly smaller spores and presence of moniliniform/constricted cystidia. See macro and micro photos. Micro: Clamps present. Basidia 4-spores (some 6-spored), clamped, e.g. 14 x 4 microns. Septa not swollen or constricted. Hyphae branbching at right angles. Monomitic. Ocassional monililniform or constricted cystidia in hymenium, e.g. 40 x 5 microns, with greenish dense oily? Cytoplasm (see photos). Otherwise no cystidia seen. All hyphae hyaline. Spores: ellipsoid, hyaline in KOH, smooth, thin-walled, e.g. 3.8 - 3.9 x 2.0-2.2 microns, greenish-yellow in Melzers. Hymenium loosely arranged. Subhymenial hyphae immediately below basidia are narrow (1.5-2 microns wide).	*Xanthorrhoea preisii*	1/06/2010
Banksiamyces	*sp.*	BOUGHER 00697	Characteristic Features: (i) Bluish-grey minute discs (0.5 - 1 mm diam.) with paler smooth margin (under high mag. Kense the rim has a whitish edge); (ii) Stem absent. (iii) Surface smooth or very minutely verrucose, without any flakes or exudates (just a waxy appearance). This has Banksiamyces features such as: amyloid asci tips, gelatinised subhymenium or excipulum, ectal excipulum of brown cells; narrow ellipsoid non-septate spores. However thye paraphyses are not branched, and a stalk is lacking on the fruit bodies. BOUGHER 697 therefore does not match any of the named species. It lacks the stalk, whitish encrustations, and branched cystidia of B. toomansis. MICRO: Spores hyaline, thin/ smooth-walled, cylindric-narrow ellipsoid, in side view one side flattened slightly, ends equal width or one end slightly wider, e.g. 8.5-10.5 x 2.7-3.3 microns. Paraphyses cylindric, hyaline, thin/smooth walled, not projecting, e.g. 2-3 microns wide, septate. No gelatinous matrix seen around the tips of the paraphyses. Asci with amyloid tip, fusoid, base unswollen, e.g. 62 x 5 microns, 8-spored. Medullary excipulum of dark brown, swollen globose cells (see photo). Ectal excipulum margin of a tight palisade of cylindrical sepata, thin-walled (some bluish?) hyphae 1.5-4.5 microns wide (see photos). Subhymenium/medulla gelatinised hyaline hyphae (see photo).	*Banksia attenuata*	27/07/2010
Botryobasidium	*subcoronatum*	BOUGHER 00681	Characteristic Features: fully resupinate, thin, firmly attached, white to pale cream growth; (ii) Margin undifferentiated, diffuse; (iii) surface minutely granular-farinose (under lens), dry, soft; (iv) no rhizomorphs present. Same species as BOUGHER 682. The presence of fusoid-amygdaliform spores, no cystidia, monmitic hyphal system with clamp connections on all septa, and 6-spored broadly cylindric basdidia suggests that this collection is Botryobasidium subcoronatum. Micro: Spores fusoid-subamygdaliform, hyaline, smooth/thin-walled, e.g. 6.7-8 x 2.9-3 microns. Monomitic. Broad hyphae with clamps on all septa, 6-8 microns wide (see photo). Basidia small, broad cylindric to urniform, 6-spored (at least) see photo. Most of the hymenium seems to be collapsed in this collection and in BOUGHER682.	*Eucalyptus marginata*	15/07/2010
Botryobasidium	*subcoronatum*	BOUGHER 00682	Characteristic Features: Fully resupinate, white to pale cream, thin, soft, margin not differentiated, no rhizomorphs, surface minutely farinose-granular. Same species as BOUGHER 681.	*Eucalyptus marginata*	15/07/2010
Ceriporiopsis	*sp. cream*	BOUGHER 00643	Characteristic Features: (i) labyrinthine, quite angular pores with dentate walls; (ii) thin, firmly attached growth with low silky whitish margin; (iii) mainly cream to pale yellowish but with some tan blotches. Micro: Spores ellipsoid, smooth, I large oil bubble (in KOH), e.g. 5-5.2 x 3-3.4 microns. Subiculum of clamped thick-walled pale yellow (in KOH) smooth-walled hyphae, e.g. 3 microns wide. Hyphae elsewhere also clamped but not thick-walled. Scattered ampulliform or ventricose cystidia, hyaline, e.g. 11 x 3 microns.	*Eucalyptus rudis*	24/06/2010
Ceriporiopsis	*sp.*	BOUGHER 00699	Characteristic Features: (i) Resupinate, soft, pored, white with some pale tan bruising; (ii) margin white, densely fimbriate, sterile; (iii)white in transverse section, about 1 mm thick, with subiculum evident (tubes extend to the basal substrate. Monomitic hyphal system, clamps abundant, resupinate form, absence of metuloids, white colouration with minor bruising all point to genus Ceriporiopsis. However that genus is supposed not to react with Melzers. MICRO: Spores ellipsoid, adaxially asymmetric to suballantoid, with 1 or 2 oil bubbles (in KOH), smooth/thin-walled, e.g. 5-6 x 2.7-3 microns. Amyloid? (to be confirmed). At growing margin with slender cystidioles with clamp at base (see photo), some with swollen apex, minutely but densely encrusted. Cystidioles are abundant at the pore mouths too. No metuloids. Loose crystal present. All hyaline or near so. Generative hyphae with clamps on all septa. Basidia 4-spored, clavate, clamped, e.g. 20-26 x 5.8-7 microns. Ocassional short, e.g. 15 x 4 microns, lageniform smooth cystidia in hymenium, not projecting (see photo). All hymemial and context hyphae including the cystidioles are dextrinoid, and free golden oily globules are abundant (see photos).	*Banksia attenuata*	27/07/2010
Clavulina	*vinaceocervina*	BOUGHER 00678	Characteristic Features: Cream-pink coral fungus with branching claw-like tips.	*Eucalyptus marginata*	15/07/2010
Clitopilus	*hobsonii*	BOUGHER 00640	Characteristic Features:(i) hairs on pileus extending down to the bark; (ii) stipe less evident in mature specimens due to caudate folding over of pileus. Pileus white with translucence slightly bluish, margin wavy, slightly inrolled, diam. Up to 5mm. Stipe glabrous, 1 to 1.8mm long when young x less than 0.5mm wide, obscured when mature.Gills distant to close near the fold, tapering towards centre, white.	*Eucalyptus rudis*	24/06/2010

Genus	Species	Code	Descriptive Notes	Plants	Date
Coniophora	*puteana*	BOUGHER 00679	Characteristic Features: Fully resupinate, dull olive-brown, very minutely velvety and dry surface forming low cushions in some parts; (ii) In cross-section 0.5 mm thick with 2 or 3 alternating paler/darker layers of quite soft gelatinous or fleshy material; (iii) Margin fringed with white mycelium; (iv) With large areas of immature hymenium which are pale cream to white with a thin-matted surface. The presence of long basidia which project well beyond the hymenium, smaller narrow oily cystidia, large golden ovoid thick-walled spores yielding a brown spore deposit, absence of clamp connections, and a monomitic hyphal system all point to this being genus Coniophora, particularly C. puteana (= Cunningham's C. olivacea). Spores golden brown in KOH, not strongly dextrinoid, ellipsoid or ovoid, sometimes highly variable, thick/smooth-walled, with granular cytoplasm, e.g. 10.5-13.2 x 6.5-7.4 microns. Spores very abundant. Basidia very long cylindrical, projecting greatly, 4-spored, with granular contents at first thenlater collapsing and empty, not clamped, e.g. 78-96 x 7-8.5 microns. Subhymenium and context below of semi-gelatinised agglutinated or tightly packed collapsing hyaline hyphae. Immature areas of fruit bdoy with not cllapsed hyphae 3-6 microns wide, not clamped, not parallel walls. Cystidia scattered, cylindric-sinuate, with apex not swollen, not septate, with glassy cytoplasm, not projecting, e.g. 49 x 3 microns. Monomitic hyphal system. Subhymenium arranged perpendicular to the surface.	*Banksia attenuata*	15/07/2010
Coprinellus	*angulatus*	BOUGHER 00693	Characteristic Features: (i) Young pileus tan, densely covered with easily removable setules (which appear as tiny short stiff white hairs); (ii) Yound stem covered with dense furfuraceous white clumps, not evident when mature but then the caulocystidia near the apex are evident as a pruinositiy; (iii) Mature cap plicate to near centre, grey with persistently dull tan centre, up to 15 mm diam. ; (iv) mature stem white, narrow-spindly, up to 50 x 2 mm.	*Eucalyptus gomphocephala*	27/07/2010
Cortinarius	*sp. central frost*	BOUGHER 00694	Characteristic Features: (i) Bright brown (near sienna) cap with translucent-striate margin and sparse white bloom near centre; (ii) Whitish cylindric, longitudinally silky fibrillose stem; (iii) Gills also bright brown with slightly paler edge. Likely to be the same species as BOUGHER 657 collected a few weeks ago under tuarts at City Beach, which also had a white central bloom (though more pronounced).	*Eucalyptus gomphocephala*	27/07/2010
Crepidotus	*sp.*	BOUGHER 00621	Characteristic Features: (i) small shelf-like, fan-shaped with reduced stem pn one side. Cap: fan-shaped, convex, surface smooth velvety dry, pale buff to snuff brown at apex when aged, edge slightly inrolled, 5-12mm.. Stem very reduced on side of cap. Gills: pale buff, edge fimbriate, closely spaced.	*Eucalyptus gomphocephala*	1/06/2010
Galerina	*marginata*	BOUGHER 00676	Characteristic Features: Hygrophanous, translucent-striate pileus; (ii) Annulus on the downward tapering, longitudinally striated stipe. Cap 25-35 mm diam., convex or slightly umbonate, pale cinnamon when young then darker with age, margin translucent-striate, hygrophanous. Lamellae slightly decurrent, closely spaced, edge smooth. Stipe 20-45 x 3-5 mm, tapering upwards, hollwo in centre, darkest at base (rusty), annulus evident . Cheilocystidia lageniform. Pleurocystidia similar, sometimes with swollen apex. Spores ovoid to mitriform, with loosening perisporium, verrucose with plage, no germ pore, e.g. 9.2-10.1 x 5.9-6.6 microns.	*Eucalyptus marginata*	15/07/2010
Geastrum	*sp.*	BOUGHER 00620	Star-like folded back exoperidium, 6-8 parts. Endoperidium up to 8mm broad, globose with an attenuated apex, light grey (Methuen 6D2), thin, papery, dry, smooth, becoming wrinkled, with minute stem. Peristome beak-like, up to 0.5mm, with pale fibrils, diam. 1-2 mm. xoperidium 6-8, papery thin arms 5-6mm long.	*Eucalyptus gomphocephala*	1/06/2010
Geastrum	*sp.*	BOUGHER 00624	Characteristic Features: (i) star-like appearance with folded back exoperidium of 8 parts; (ii) Spore sac sessile xpanded fruit body up to 20mm broad. Endoperidium up to 1omm broad, with attenuated apex. Light grey (6D2), immature lighter grey almost white, about 1 mm thick exoperidium up to 10mm long, folding under. Persitome 1.5mm diam., with pale fibrils.	*Eucalyptus gomphocephala*	1/06/2010
Grandinia	*sp.*	BOUGHER 00642	Characteristic Features: (i) thin soft, easily rubbed off, dirty cream; (ii) surface with short columns less than 0.5mm tall, each isolated from each other, low granular growth inbetween; (iii) no rhizomorphs. Micro: spores small hyaline, ellipsoid, slightly allantoid, e.g. 3.2 x 1.7 microns. Clamps present on hyphae.	*Eucalyptus rudis*	24/06/2010
Gymnopus	*sp.*	BOUGHER 00675	Characteristic Features: Gilled mushroom with eccentric stipe attachment, many different lamellae lengths, pinkish-brown undulating cap, dark flattenned stipe with fibrous hairs in lower part. Cap 20-70 mm, somwhat lobed, surface smooth, undulating, moist. Colour brownish. Margin plane to slightly inrolle. Gills adnaexed to sinuate, pinkish-beige, edge smooth, great variation in lengths of lamellae creating undulating effect. Many very short lamellae near cap margin. Stem up to 40 x 3-5 mm, very dark at base to lighter above. Flatenned, with groove down centre line. Surface dry somewhat fibrous, esp. near base. Stipe hollow in older specimens. Spores broad ellipsoid, hyaline in KOH, smooth/thin-walled, e.g. 4.1-5.1 x 3.5-4.5 microns.	*Eucalyptus marginata*	15/07/2010
Hyphoderma	*setigerum*	BOUGHER 00656	Characteristic Features: (i) minutetly felty, very thin, dull cream to ash grey, fully resupinate soft growth easily rubbed off the wood. This seems to fit into the Hyphoderma setigerum complex with septate cystidia. See discussion in Nilsson et al (2003) Mycol. Res. 107(6). Note: no Australian specimens were in that study. However, BOUGHER 656 seems to lack clamps on the septa of the cystidia. Micro: Spores hyaline in KOH, smooth-walled, with 1 or 2 large oil globules, ellipsoid with a slight adaxial depression, e.g. 9.3-10.5 x 3.7-4.5 microns. Not amyloid or dextrinoid. Cystidia hyaline in KOH, slightly thick-walled except at apex, some with mucilaginous crystalline material at apex (see photos), not dextrinoid, some with a septum or 2, not clamped. The cystidia are not lyocystidia as theyare not as thick-walled and have a simple base. Really it seems there are two types of cystidia present: the non-septate sometimes tapering thinner-walled ones plus the thicker-walled septate ones. In another section many of the cystidia were covered with material along their whole length (see photo) but this was not seen anywhere else. Basidia with clamps, collapsing, hyaline, narrow clavate, sphaeropendunculate when developing, e.g. 23-30 x 5.6-6.5 microns. Monomitic. Virtually no subiculum - only subhymenial hyphae approx. 2.5 microns wide, hyaline, clamped.	*Eucalyptus gomphocephala, Allocasuarina humilis*	1/06/2010

Genus	Species	Code	Descriptive Notes	Plants	Date
Hyphodontia	*sp. spiky warts*	BOUGHER 00700	Characteristic Features: (i) Pale grey fully resupinate thin growth with undifferentiated margin; (ii) hymenium tuberculate-odontoid with round-topped warts covered by projecting cystidia (see under high mag lens), warts crowded on top of a gelatinous-waxy dull grey subiculum; (iii) no rhizomorphs present. The projecting and tapering metuloid cystidia can be seen projecting out from the tubercules under high power lens (see photos). BOUGHER 700 seems to fit Hyphodontia, but the cystidia are usually cylindric and not metuloid in that genus. The cystidia of BOUGHER 700 are more like those of genera such as Phanerochaete or Peniophora, but those genra usually have smooth fruit bodies - not tuberculate. Note the macroscopic similarity to "Grandinia" BOUGHER 642 and E8035 but they differ microscopically, e.g. spore shape, lack of metuloids, clamps present. BOUGHER 700 differs from "Hyphodontia sp - odontoid"e.g. E9399 by the presence of metuloids and in spore shape. MICRO: Spores cylindric in face view, suballantoid uin side view, hyaline, thin/smooth-walled, with 2 oil bubbles (in KOH), e.g. 3.5-4.3 x 1.5-2.1 microns. Conical metuloids abundant and projecting, e.g. 37-40 x 7 microns, hyaline. No clamps. The waxy subiculum consists of tightly interlocking thin/smooth-walled hyaline hyphae 3-5 microns wide. No clamps seen. Thick-walled globose structures (clamydospores?) scattered in the subiculum (see photos). Monomitic hyphal system.	*Eucalyptus gomphocephala*	27/07/2010
Hypochnicium	*sp.*	BOUGHER 00698	Characteristic Features: (i) Grey, resupinate, minutely felty, thin, indeterminate growth with undifferntiated margin. The structures fit genus Hyphoderma except the thick-walled spores which would place BOUGHER 698 in genus Hypochnicium: H. sphaerosporum group of Eriksson & Ryvarden Vol. 4. Perhaps closest to H. geogenium, although the "white, more or less tuberculate" hymenium of that species does not match BOUGHER 698. MICRO: Clamps present. Sp[ore: ellipsoid, hyaline in water, smooth slightly thickened wall, e.g. 7.1-8.5 x 4.4-5.6 microns, small hylar appendix. Numerous spores in slide preparations. Cystidia glassy or hyaline, projecting, cylindric or tapering, smoot/thin-walled. Apex rounded, rarely papillate, e.g. 65-89 x 8-9 microns; arising from clamped smooth/thin-walled hyphae e.g. 3 microns wide. Projecting only partially up to about half their length or often less. Basidia 4-spored. Monomitic hyphal system.	*Banksia*	27/07/2010
Hypochnicium?	*sp.*	BOUGHER 00677	Characteristic Features: (i) Indeterminate fully resupinate, easily removed, soft, cream to pale yellow growths; (ii) Surface granulose (under lens), otherwise appears smooth. Micro: spores ellipsoid to broadly ovoid, smooth-walled, hyaline in KOH, faintly amyloid, one large oil bubbble (in KOH), e.g. 2.8-2.9 x 1.7-2.5 microns. Subiculum of loosely intertangled, thin-walled hyphae, e.g. 2-3 microns wide, adorned with sharp-angular crystals apparently sitting on the wall surface, branching at right-angles, sparsely septate, non-clamped (see photos). Some hyphae with brown cytoplasm. Subhymenial hyphae hyaline, smooth-walled (no crystals), septate, non-clamped, 2-3 microns wide. Basidia clavate (not urniform), hyaline, thin-walled, 4-5 spored, long thin sterigmata, e.g. 12.4 - 24 x 4.0 - 7.0 microns. No cystidia seen other than scattered cylindric or tapering glassy-hyaline barely projecting elements (see photos). All tissues dextrinoid. Monomitic hyphal system. May be Hypochnicium (but BOUGHER677 lacks clamps).	*Eucalyptus marginata, Astroloma pallidum*	15/07/2010
Inocybe	*rufuloides*	BOUGHER 00618	Same species as collected at this location in 2008 - BOUGHER 479 (see full description of that collection) but was labeled then as "Inocybe sp. pines". It is also same species as BOUGHER 541 from the central pine plantation at Bold Park in 2009. This collection (BOUGHER 618) was very dry and struggling due to a preceding week of no rainfall.	*Pinus radiata*	1/06/2010
Junghuhnia	*sp.*	BOUGHER 00702	Characteristic Features: (i) Cream pored resupinate with orange-reddish stains. The following may fit genus Junghuhnia: clamps on generative hyphae, dimitic hyphal system, cylindric skeletocystidia. Same species as E9435. MICRO: Spores ellipsoid, hyaline, smooth/thin-walled, e.g. 3.5 x 1.9 microns. Metuloids cylindric. Many cystidia? of another type also cylindric also present and abundant, some with brown contents (perhaps these just have their crystals dissolved away?). Subiculum of interwoven thick-walled hyphae agglutinated in part (see photo). Basidia clamped.	*Eucalyptus gomphocephala*	27/07/2010
Mycena	*sp. yellow cap*	BOUGHER 00639	Characteristic Features: (i) small with yellowish cap and white stem. Cap: very young button less than 1mm to mature capos up to 9mm diam. Yellowish centre, paler edge, slightly moist, very finely dimpled. Overall shape round convex, slightly umbonate when old. Gills very pale yellowish cream, subdecurrent, 1mm deep, smooth slightly wavy edge, crowded. Stipe up to 44mm tall, same colour as gills (pale), hairy at base, attached to bark pieces.	*Eucalyptus rudis*	24/06/2010
Mycena	*kuurkacea*	BOUGHER 00683	Characteristic Features: (i) Exudes reddish liquid when cut, and rapidly hygrophanous. Cap dark brick when fresh, soon fading to clay pink. Campanulate, 5-13 mm diam, translucent-striate at margin, surface smooth and dry. Gills distantly spaced, edges brick red. Stipe 1-2 mm wide, hollow, tapering at base, clay pink.	*Eucalyptus marginata*	15/07/2010
Peniophora	*cinerea*	BOUGHER 00696	Characteristic Features: (i) Fully resupinate tough, purplish-grey fruit bodies; (ii) Surface smooth, velvety to the eye, minutely glistening under lense. The greyish-purplish colour, allantoid spores, stalked metuloids, and absence of a subicular layer all point to Peniophora cinerea. This is not the same as E9427 (P. sp "grey paint"). Micro: Spores hyaline in KOH, allantoid, smooth/thin-walled, e.g. 7.1-7.6 x 2.2-2.5 microns. Metuloids abundant, emerging from different levels but not in linear zones, e.g. 40-49 x 7-10 microns, fusoid-ventricose with a pedicel. Only their tips project beyond the hymenium. Subhymenium seems quite gelatinised and no subiculum is apparent. Basidia cylindric, 4-spored, e.g. 22 x 5 microns, hyaline, collapsing. Monomitic hyphal system.	*Eucalyptus gomphocephala*	27/07/2010
Phanerochaete	*tuberculata*	BOUGHER 00641	Characteristic Features: (i) Hymenial surface finely velvety and glistening (under lens), cream to pale tan; (ii) margin white, cottony thick, sometimes effused-reflexed; (iii) becomes coriaceous upon drying, firmly attached to the substrate; (iv) in cross-section, about 0.5-1mm thick, 1-layered, concolourous with hymenial surface; (v) no rhizomorphs. Micro: Spores ellipsoid, hyaline in KOH, smooth-walled, e.g. 6.5-8.8 x 3.2-3.5 microns. All tissues hyaline in KOH. Oily blobs throughout. Oily cystidia present: cylindric to slender clavate, smooth-walled, e.g. 24-30 x 3-4 microns. Clamps present in hymenium. Monomitic. Basal hyaphae some thick-walled, crystal-encrusted, clamps rare on some hyphae.	*Eucalyptus rudis*	24/06/2010
Phlebia	*rufa*	BOUGHER 00655	Characteristic Features: (i) merulioid hymenium (blunt thick labyrnthine poroid folds; (ii) overall colour cream with white margin; (iii) margin minutely felty without any folds, white, effued-reflexed. This is a common resupinate in Perth's bushlands. Paler and dried specimens superficially may be mistaken for Byssomerulius corium but the latter lacks poroid development of the hymenium. Micro: Spores hyaline in KOH, smooth-walled, cylindric, e.g. 5.9-6.4 x 2.6-2.7 microns. Basidia 4-spored, cylindric, e.g. 20 x 4.5 microns. No clamps. No cystidia seen.	*Eucalyptus gomphocephala, Allocasuarina humilis*	1/06/2010

Genus	Species	Code	Descriptive Notes	Plants	Date
Phlebia	*rufa*	BOUGHER 00695	Characteristic Features: (i) Resupinate fruit bodies with thin-rubbery smooth effused-reflexed margin, pale pinkish-brown, easily removed from the wood as a rubbery thin structure which is smooth and mesenteric (fried chicken skin-like) on the inner surface; (ii) Hymenium of irregular, reticulate, labyrinthine pores with smooth-rounded walls. The hymenium can be readily peeled off the underlying rubbery-mesenteric subiculum. The colour seems paler than P. rufa, and the hymenium does not seem to be gelatinised as much. Micro: Spores hyaline, smooth-walled, ellipsoid, not allantoid, e.g. 4.5-4.7 x 2.3-2.4 microns. Fruit body in vertical section consists of a basal narrow layer of thick-walled clamped hyphae, a broader mid layer of agglutinated thin-walled hyphae, and the hymenium. Clamps present. Basisia 4-spored. No cystidia seen. The hyphae at the base of the subiculumseem to be thicker walled than indicated by Erikson et al volume 6, but otherwise BOUGHER 695 seems to match P. rufa. This species is remarkable as fruitbodires canbe easily peeled off the wood intact as a membranous rubbery structure resembling the skin of fried chicken.	*Eucalyptus gomphocephala*	27/07/2010
Pleuroflammula	*praestans*	BOUGHER 00653	Characteristic Features: (i) fan/shell shape; (ii) Becomes paler as maturing. (iii) coarsely serrate gill edge. Cap up to 12mm across. Rough crusty patterns becoming more pronounced with maturity and developing deep colouring as though they have been seared. Small specimens ochre, mature specimens yellow. Margins slightly crenate. Gills golden yellow to ochre at maturity, 2mm deep, golden ochre, margin serrate, uneven. Stem 2-5 x 1-1.5 mm, equal to slightly tapered, cream with crusty seared appearance similar to caps. Base of stem wooly where attached to the wood. Micro: Spores rich brown in KOH, smooth-walled, ellipsoid (ovoid in face view), e.g. 8.3-9.2 x 5.3-5.5 microns. Clamps present. Isolated dense clusters of cheilocystidia with honey-brown pigment, smooth-walled, e.g. 42 x 4 microns, cylindric to cylindro-clavate. No pleurocystidia. Basidia 4-spored.	*Eucalyptus gomphocephala, Allocasuarina humilis*	1/06/2010
Rosellinia	*sp.*	BOUGHER 00701	Characteristic Features: (i) Black spherical perithecial flasks approx. 0.5-0.7 mm diam., and con-joined or adjacent in dense clusters; (ii) Top vie of apex looks like a small raised papillate ostiole centrally positioned in a shallow volcano, e.e. a flat area surrounded by a raised rim; (iii) Little black carbonised material inbetween the perithecia, but not consistently present and always thin and resupinate so the perithecia sitcompletely exposed upon the surface of the substrate (unlike e.g. Hypoxylon bovei which has woody stromal tissue covering up to most of the length of its perithecia). If BOUGHER701 is considered within genus Hypoxylon, the presence of an ostiolar disc plus a raised ostiole would place it in Hypoxylon section Annulata. However the erumpent perithecia and absence of stromatic tissue (mainly) inbetween the perithecia suggest that BOUGHER701 could be genus Rosellinia. However the spores are smaller than for most species of Rosellinia but similar in size to a few of the species such as R. stenasea (ss Petrini 2003, NZJBot.). MICRO: Spores dark brown to black in KOH, brown in Melzers, smooth, ellipsoid-fusoid, flat on one side in side view, with a pale straight longitudinal narrow slit (germination cleft) along entire legth on the less convex side of the spores, e.g. 11.2-12.6 x 5.4-6.0 microns. No perisporium evident, but with a gelatinous layer on the surface about 0.5 microns thick (see photo). No pigment leaches out when mounted in KOH.	*Eucalyptus gomphocephala*	27/07/2010
Schizopora	*paradoxa*	BOUGHER 00625	Characteristic Features: (i) ideterminate labyrinthine skin fungus. Indeterminate spreading growth 2.5mm thick. Colour f top layer cream, gelatinous under layer clay buff. Top view maze-like, soft t touch and dry. Easily peeled off the wood. Margin is itrregular, with lower pores and paler-white. No rhizomorphs seen.	*Eucalyptus gomphocephala*	1/06/2010
Undetermined anamorph		BOUGHER 00703	Characteristic Features: (i) white growth on dead portuguese millipedes. Not known if this fungus (which is often present on millepedes) colonises and grows on the millipedes only after they have dies, or if the fungus infects living millipedes and contributes to thyeir death. If it is the latter, the fungus could be investigated as a potential biological control of the pest portueguese millipedes. MICRO: chains of minute, globose, smooth conidia on the ennd of broad hyphae (see photos).	*Eucalyptus gomphocephala*	27/07/2010
Undetermined ascomycete		BOUGHER 00623	Characteristic Features: (i) Flat sessile discs with upturned white inrolled rim; (ii) hymenium slate grey (bluish-grey); (iii) outer surface pale greyish, minutely roughened but lacking any hairs. Micro: Asci: cylindrical, blue tipped (in Melzers), e.g. 95 x 8.5 microns, uniserate with 8 ellipsoid to flatenned to reniform/curved smooth non-guttulate hyaline spores, e.g. 13.7-14.6 x 4.3-4.5 microns. Paraphyses cylindrical, not bent, smooth-walled, not projecting beyond the asci, 1.5-2 microns wide. Medullary exipulum textura globosa, becoming increasingly thick-walled and darkly pigmented towards the ectal exipulum. Cells up to 16 microns wide, walls up to 1.5 microns thick with dark brown/black pigment on walls and between the cells. Subhymenium of hyaline irregular cells up to 5 microns diam. Outer surface of exctal exipulum a chain of cells forming a hymenidewrm of clavate to vesiculose enad cells, e.g. 18 x 7 microns in size (see micro photos).	*Eucalyptus gomphocephala*	1/06/2010
Undetermined resupinate	*sp. grey thin*	BOUGHER 00644	Characteristic Features: (i)ash grey, thin resupinategrowth; (ii) granular texture as seen under hand lens. Not genus Tubulicrinis. Micro: spores hyaline in KOH, boletoid - fusoid and adaxially asymmetrical, smooth-walled but with granulr contents, e.g. 8.2-8.8 x 3.5-3.6 microns. Hyphae baod (5-7 microns), hyaline in KOH, yellowish in Melzers), not clamped, smooth-walled, branching at rght angles. Asidia hyaline, short vesiculose, 8-spored, e.g. 15 x 9 microns, non-clamped, arsing in bunches from collapsing subtending hyphae. Monomitic. No cystidia seen.	*Eucalyptus rudis*	24/06/2010