Client report
to the Botanic Gardens and Parks Authority

BOTANIC GARDENS
& PARKS AUTHORITY

Fungi survey -
Kings Park and Botanic Garden 2011

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Perth
Urban
Bushland
Fungi

Western Australian Naturalists Club

Urban Bushland Council WA Inc

Figures 1 - 4: Examples of the fungi discovered in Kings Park during 2011. Each of these species is highlighted in the discussion section of this report.

Figure 1: *Parasola auricoma* (BOUGHER 748). A new record for Australia.

Figure 2: *Coprinellus pyrrhanthes* (BOUGHER 733). A new record for Australia.

Figure 3: *Protubera canescens* (BOUGHER 744). Is it an early developmental stage of the Cage Fungus *Ileodictyon*?

Figure 4: *Inocybe sp. 'jarrahae'* (BOUGHER 909). A new species to science.

Fungi - Kings Park and Botanic Garden: 2011

Background and Objectives

Kings Park and Botanic Garden is located only 1.5 km from central Perth, Western Australia, and includes a regionally significant bushland covering about 267 ha of the 406 ha Park. Kings Park lies on Spearwood dune systems with underlying limestone geology. The bushland has various vegetation types including woodlands with Tuart (*Eucalyptus gomphocephala*), Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*), Banksia (including *Banksia attenuata, B. grandis, B. menziesii*, and *B. prionotes*), and Allocasuarina (*Allocasuarina fraseriana*). Three major plant communities occur at Kings Park – limestone heathland, Banksia woodland, and low moist areas with *Banksia ilicifolia* (Barrett and Tay, 2005).

Fungi and their linkages with flora and fauna undoubtedly have central roles in maintaining the ecology and health of the bushland at Kings Park. Fungi are also present in the Botanic Garden, including beneficial and decomposer fungi and some troublesome pathogenic fungi such as *Armillaria luteobubalina*. Major human-induced changes in the vegetation particularly since European settlement are likely to have caused changes in the fungus communities at Kings Park. The nature of these changes for fungi is not known because there have been only sporadic, uncoordinated records of fungi and their ecology at the park. Efforts to document the fungi at Kings Park since European settlement in the area have resulted in the accumulation of numerous records and collections, indicating that many hundreds of species of fungi are likely to occur in the park. However, the efforts have been mostly sporadic and uncoordinated and have not yielded an accurate measure of the total number of fungi species recorded to date at Kings Park. A historical investigation into the the fungi recorded from Kings Park and Botanic Garden dating back to the first known scientific record in 1839 revealed that a total of 285 scientific names of fungi had been recorded from Kings Park up until 2009, with 122 of the names designated to species level (Bougher 2010a, 2010b).

Any estimate the number of fungi species known so far from Kings Park depends on the level of acceptance of the many unverified or unverifiable names as representing or not individual species. In 2009, the Botanic Gardens and Parks Authority took a significant step to address the poor knowledge base about Kings Park's fungi by contracting the first of intended annual surveys to document the macrofungi of Kings Park. The survey in 2009 recorded a total of 123 species of fungi (Bougher 2009a). A second contract survey, in 2010, recorded a total of 108 species of fungi (Bougher 2010c). To date, 194 fungi (including 26 slime moulds) have been named to species level from Kings Park (Bougher 2011). The total number of fungi and slime mould species known from Kings Park to date is undoubtedly much greater. Many unidentified or possibly inaccurately identified records from Kings Park remain to be verified.

Ongoing protection and improvement of knowledge about bushland Flora, Fauna and Fungi is an integral part of future management of Kings Park and Botanic Garden. Fungi have direct relevance to the Strategic Policies in the Kings Park and Botanic Garden Management Plan 2009-2014 (Botanic Gardens and Parks Authority 2009). This includes scientific aspects of conserving and enhancing any native biological diversity of the designated land, inspiring educational & community involvement in biodiversity conservation, health & restoration of bushland, and undertaking research into collections of WA and other flora. The current work was contracted to improve the knowledge base about fungi within Kings Park and Botanic Garden.

The objective of this work was to:

Undertake the third annual fungi survey for the draft Kings Park and Botanic Garden Draft Management Plan 2009-2014 (Botanic Gardens and Parks Authority 2009). This survey addressed the following:

a. Field survey

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

b. 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 recorded.

Methods

Fungi survey

Fungi were recorded and collected in Kings Park from early June to early July 2011. The park was also re-visited in early August because there had been significant rainfall throughout mid to late July (see Chart 1 below). Four sites representing different vegetation types in Kings 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. All fungi observed were georeferenced, recorded and photographed *in situ*. Selected fungi were collected for later description, vouchering and identification. During recording and 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 Kings 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 Kings Park and Botanic Garden comparable to available data of other similar 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).

Chart 1: Rainfall for Perth in 2011 compared with the long-term average.

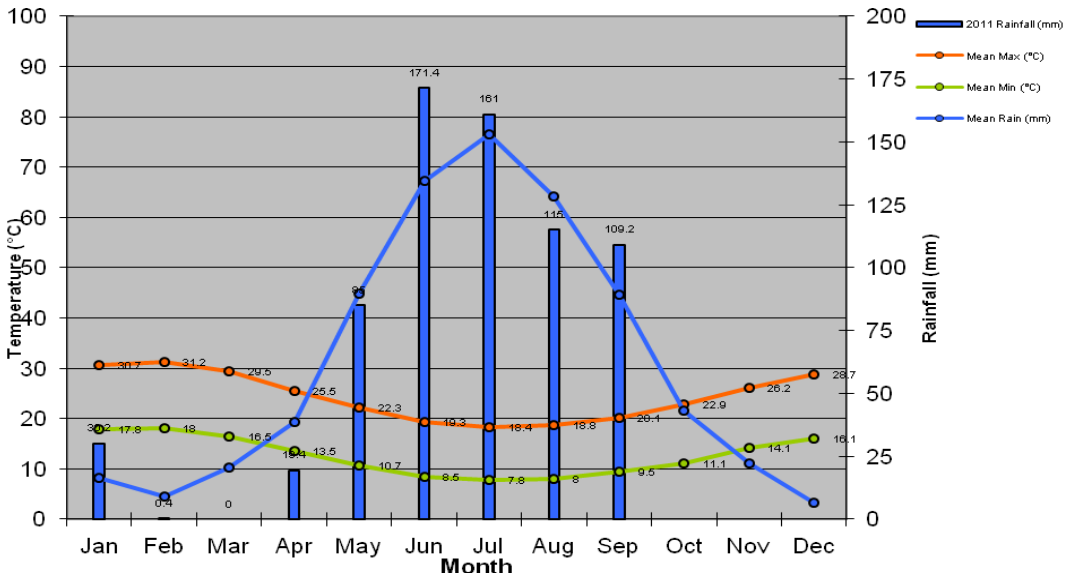
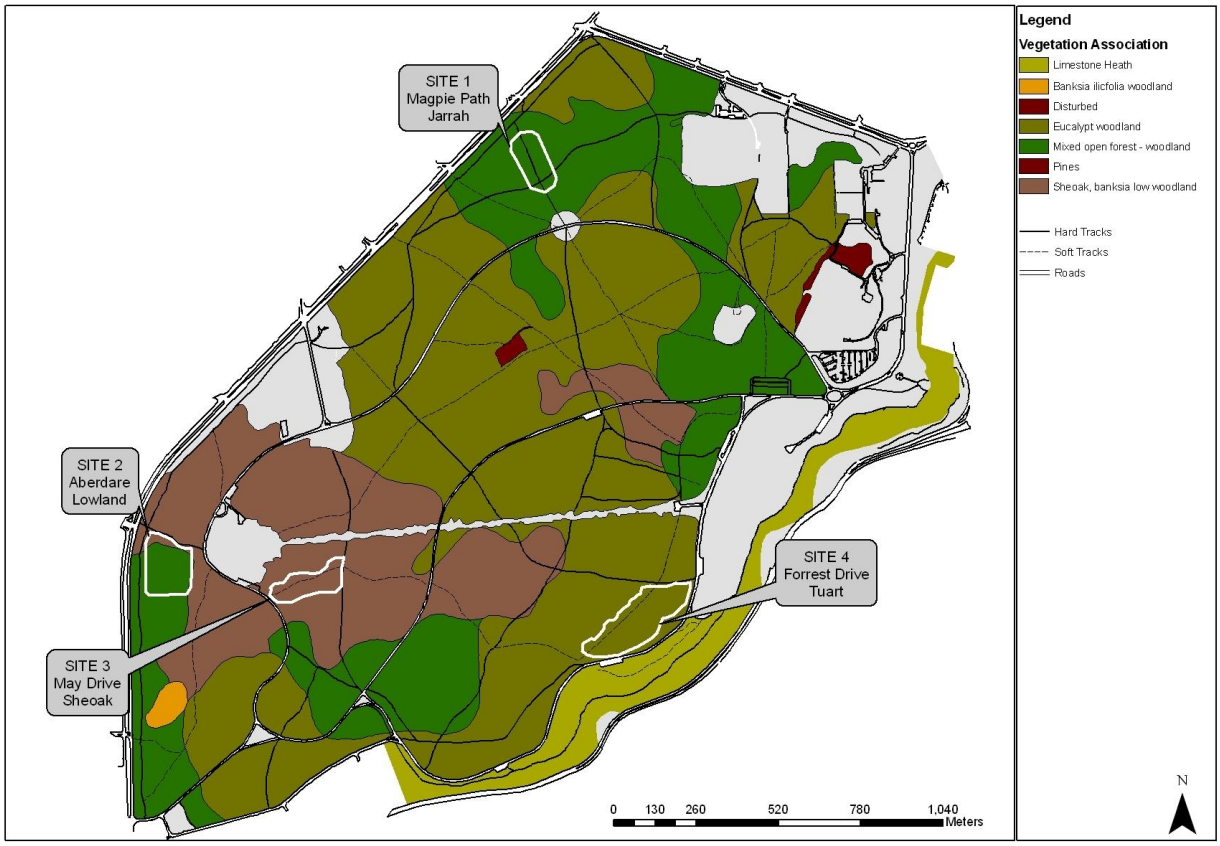


Table 1: Sites surveyed for fungi at Kings Park in 2011.

Site ID	Site Name	Details/ Coordinates	Vegetation	Notes	Survey Visits 2011
1	**Magpie Path**	Approx. 25 m on either side of 200 m length of path. Survey south point on paved path: 31° 57' 17.93" S x 115° 49' 54.83". North point on path: 31° 57' 11.71" S x 115° 49' 51.90".	Jarrah open woodland	This area was partly burnt in 2009. Some invasive sugar gums are present.	1
2	**Aberdare Lowland**	Approx. 25 m on either side of 150 m length of path. Survey start point on sand track off May Drive: 31° 57' 57.50" S x 115° 49' 14.80". End point on track: 31° 58' 2.32" S x 115° 49' 12.97".	Mixed open forest – woodland	South side of track last burnt 1989. More timber than in the north side (site 3).	2
3	**May Drive Allocasuarina**	Approx. 25 m on either side of 250 m length of path. Survey start point on sand track off May Drive: 31° 58' 0.00" S x 115° 49' 22.02". End point on track: 31° 57' 57.13" S x 115° 49' 30.53".	*Allocasuarina/Banksia* low woodland.	Last burnt probably in 1989. Dominated by *Allocasuarina* and Banksias but there is also a patch of young Marri.	2
4	**Forrest Drive Tuart (Block S18)**	Area approx. 400 m in length x 100 m wide on interior side of Forrest Drive. Area approx. bounded by the following points: NE corner - 31° 57' 59.11" S x 115° 50' 8.51". NW corner - 31° 58' 6.88" S x 115° 49' 58.90". SE corner (at Forrest Dr.) - 31° 57' 58.90" S x 115° 50' 13.06". SW corner (at Forrest Dr.) - 31° 58' 7.44" S x 115° 49' 59.60".	Tuart woodland	Extensively burnt early in 2009. Fungi survey primarily in the remaining unburnt fringes.	2
5	**Opportunistic**	Entire area of Kings Park.	Natural and planted	Includes all other areas of bushland and gardens in the Park.	3

Map 1: Sites surveyed for fungi at Kings Park and Botanic Garden in 2011



Results

A total of 106 species of fungi were recorded in 2011 during the period of this consultancy (Table 2). This number is a conservative figure because it includes 20 names that represent an as yet unresolved mixture of unknown numbers of species, e.g. *Cortinarius ragbag* (see Table 2).

The fungi from 2011 represent 72 known genera and 43 families (+ 8 undetermined or ragbag groupings for which genera and families unknown) (Table 3). All species are considered to be indigenous except one exotic species (introduced from outside Western Australia) – *Suillus granulatus* which is a mycorrhizal associate of *Pinus*. Descriptive data for the fungal collections from 2011 that were vouchered for permanent reference are given in Appendix 2.

- 25% of the species (27) from the current 2011 survey are considered to be new records for Kings Park (colour entries in Table 2), i.e. they do not match any of the fungi from the 2009 or 2010 surveys, or any of the pre-2009 names that have specific epithets. *
- 75% of the fungi (79 species) in the current survey are considered to be the same as species recorded before 2009 (black entries in Table 2), i.e. same as any of the pre-2011 names that have specific epithets.
- 12 of the 27 new records are identified to species level, 12 are only identified to genus level, and 3 are not assigned a genus or a species name (Table 2).
- *Coprinellus pyrrhanthes* and *Parasola auricoma* previously had not been confirmed in Australia.
- The only record found in all five of the survey sites was a group of *Psathyrella* occurring in litter representing at least several species of that genus. The following were recorded in four of the sites: *Calocera guepinioides*, *Ceratiomyxa fruticulosa*, *Gymnopilus allantopus*, unidentified *Mycena* species on wood, and *Resupinatus subapplicatus*.
- Saprotrophic fungi (92 species) were represented by more species than mycorrhizal fungi (11) and pathogenic fungi (1) (Table 3).
- Fungi were present in a wide range of vegetation and microhabitat types. Leaf litter with 98 species and dead wood with 64 species, had the greatest diversity of fungi (Table 3).
- As in previous years, *Pholiota highlandensis* was observed on recently burnt ground. However other fire recovery species previously seen at Kings Park such as *Anthracobia melaloma*, *Peziza tenacella*, *Pulvinula archeri* and *Hygrocybe sp. pearly* were not observed in 2011.

* NOTES: (i) The figure for "new records" considers pre-2009 names that have specific epithets and does not consider any pre-2009 records that were not identified to species level. (ii) Species groups listed in 2011 ("ragbags" in Table 2) are not included as new records in this report if there had been any category of name listed under a particular genus pre-2011. Therefore *Cortinarius* ragbag and *Panaeolus* ragbag are excluded because various records as *Cortinarius* sp. and *Panaeolus* sp. had been recorded at Kings Park in previous years.

Table 2: Identity and some ecological characteristics of fungal species in Kings Park 2011 (arranged in order of genus, species). **Maroon =** new records of species previously not recorded from Kings Park found during 2011. **Sp. ID refers to** Perth Urban Bushland fungi Project code numbers assigned to taxa. **"Ragbag" species names** refer to uncertain numbers of undetermined species grouped under a common name pending further studies to resolve their identity.

Forms: **BR** = bracket; **CD** = cup/disc; **CO** = coral; **CU** = cushion; **CY** = cyphelloid; **FL** = flask; **JE** = jelly fungus; MO = mould; **MU** = mushroom; **PF** = puffball/earthball; **PS** = pustules; **RE** = resupinate; **RU** = rust; **SH** = shell/fan/spoon; **TR** = truffle. ***Ecology/Life modes*** *(putative in most cases)**:*** **S** = saprotrophic; **P** = pathogenic; **M** = mycorrhizal. ***Microhabitat types:*** **A** = Animal; **B** = Bark of living tree; **BG** = Burnt ground/litter; **D** = Dung; **DT** = Diseased or dying tree/plant; **DW** = Dead wood/logs; **L** = Leaf litter or soil; **MB** = Moss on bark of living tree; **MG** = Moss on ground, wood or rocks; **U** = Underground. ***Ecology/Life modes:*** **S** = saprotrophic; **P** = pathogenic; **M** = mycorrhizal; **?** = not known or cannot be assumed with confidence. ***Microhabitat types:*** **A** = Animal; **B** = Bark of living tree; **BG** = Burnt ground/litter; **D** = Dung; **DT** = Diseased or dying tree/plant; **DW** = Dead wood/logs; **L** = Leaf litter or soil; **MB** = Moss on bark of living tree; **MG** = Moss on ground, wood or rocks; **U** = Underground

Sp. ID	*Species*	Family	Common Name	Form	Life Mode	Micro Habitat	Native / Exotic	Voucher Code	2011 SITES	1	2	3	4	5	ALL YEARS (2009 - 2011)	New in 2011
KP075	*Amanita ragbag, white with ring*	Amanitaceae		MU	M	L	N	BOUGHER 746 Davison30-2010	4				Y		1, 4	
5	*Amanita xanthocephala*	Amanitaceae	Yellow Headed Amanita	MU	M	L	N		2, 4, 5		Y		Y	Y	1, 2, 4, 5	
272	*Arcyria obvelata*	Arcyriaceae		SL	S	DW	N		1	Y					1	
7	*Armillaria luteobubalina*	Tricholomataceae		MU	P	DT	N		5					Y	5	
KP017	*Auriporia sp. orange-pored*	Fomitopsidaceae		RE	S	DW	N	E9325, E9326	3			Y			2, 3	
KP110	*Bolbitius titubans*	Bolbitiaceae		MU	S	L	N		5					Y	5	New
14	*Bolbitius vitellinus*	Bolbitiaceae	Egg Yolk Fungus	MU	S	L	N		4, 5				Y	Y	4, 5	
19	*Calocera guepinioides*	Dacrymycetaceae	Scotsman's Beard	JE	S	DW	N		1, 2, 3, 4	Y	Y	Y	Y		all	
9	*Campanella gregaria*	Tricholomataceae	Gregarious Bells	SH	S	DW	N	E9353, E9390, E9416	2, 3		Y	Y			all	
224	*Ceratiomyxa fruticulosa*	Ceratiomyxaceae	Icicle Fairy Fans	SL	S	DW	N	E9420 BOUGHER 752	1, 2, 3, 4	Y	Y	Y	Y		all	
KP102	*Chlorosplenium sp.*	Leotiaceae		CU	S	L	N	BOUGHER 732	1	Y					1	New
479	*Clitopilus hobsonii*	Entolomataceae	Tiny white fans	SH	S	DW	N	BOUGHER 515, 525	2		Y				1, 2, 3, 4	
242	*Colus pusillus*	Clathraceae		PH	S	DW	N	BOUGHER 908	4				Y		4	
KP109	*Coprinellus pyrrhanthes*	Psathyrellaceae		MU	S	L	N	BOUGHER 733	5					Y	5	New
36	*Coprinopsis cf. stangliana*	Psathyrellaceae	Western Australian Magpie Fungus	MU	S	L	N		4				Y		4, 5	
KP111	*Coprinopsis cinerea*	Psathyrellaceae		MU	S	L	N		5					Y	5	New
232	*Cortinarius ochraceofulvus*	Cortinariaceae	Golden Tuart Cort	MU	M	L	N		4, 5				Y	Y	1, 4, 5	
KP115	*Cortinarius ragbag*	Cortinariaceae		MU	M	L	N		2		Y				2	
40	*Crepidotus eucalyptorum*	Crepidotaceae	Eucalypt Crepidotus	SH	S	B	N	E9360	2, 4		Y		Y		1, 2, 4	
382	*Crepidotus mollis*	Crepidotaceae		SH	S	DW	N	BOUGHER 648	2		Y				1, 2, 4	
41	*Crepidotus nephrodes*	Crepidotaceae		SH	S	DW	N		2, 3, 4		Y	Y	Y		2, 3, 4	
176	*Crepidotus prostratus*	Crepidotaceae		MU	S	L/DW	N		4				Y		4	New
186	*Crepidotus sphaerosporus*	Crepidotaceae		SH	S	DW	N	E9367	1	Y					1	
KP098	*Dacrymyces stillatus*	Dacrymycetaceae		JE	S	DW	N	BOUGHER 730	1	Y					1	New
48	*Diachea sp.*	Stemonitidaceae		SL	S	DW	N		1	Y					1	New
54	*Exidia ragbag*	Exidiaceae		JE	S	DW	N		4				Y		1, 2 4, 5	
119	*Fomitiporia robusta*	Hymenochaetaceae	Woody Layered Bracket	BR	S	DT	N		5					Y	2, 5	

Sp. ID	Species	Family	Common Name	Form	Life Mode	Micro Habitat	Native / Exotic	Voucher Code	2011 SITES	1	2	3	4	5	ALL YEARS (2009 - 2011)	New in 2011
			Fungus													
56	*Fomitopsis lilacinogilva*	Coriolaceae		BR	S	DW	N		4				Y		4	
KP096	*Galerina marginata*	Cortinariaceae		MU	S	DW	N		1	Y					1	New
KP081	*Galerina pumila*	Cortinariaceae		MU	S	L	N	BOUGHER 672	5					Y	5	
KP042	*Galerina sp. orange-brown on wood*	Cortinariaceae		MU	S	DW	N	E9417	2, 4		Y		Y		2, 4, 5	
KP107	*Galerina sp. small brown in woodchips*	Cortinariaceae		MU	S	DW	N	BOUGHER 747 BOUGHER 770	3, 5			Y		Y	3, 5	New
KP063	*Galerina sp. small, decurrent gills*	Cortinariaceae		MU	S	L	N	BOUGHER 637	1	Y					1	
66	*Gymnopilus allantopus*	Cortinariaceae	Golden Wood fungus	MU	S	DW	N	E9355	1, 2, 3, 4	Y	Y	Y	Y		all	
68	*Gymnopilus purpuratus*	Cortinariaceae		MU	S	DW	N		4				Y		4, 5	
70	*Harknessia uromycoides*	Melanconidaceae	Tuart Nut Fungus	PS	S	DW	N		4				Y		4	
KP097	*Hemimycena sp. minute, fragile, white pileus, arcuate gills, on wood*	Tricholomataceae		MU	S	DW	N		1	Y					1	New
71	*Henningsomyces candidus*	Schizophyllaceae	Miniature Chimney Pots	CY	S	DW	N	E9361	2, 3		Y	Y			1, 2, 3, 4, 5	
74	*Hohenbuehelia ragbag*	Tricholomataceae		SH	S	DW	N	BOUGHER 750	4				Y		4	
461	*Hyphodontia arguta*	Hyphodermataceae		RE	S	DW	N		1, 3	Y		Y			1, 3	
KP003	*Hyphodontia breviseta*	Hyphodermataceae		RE	S	DW	N	BOUGHER 512 BOUGHER 774	3			Y			2, 3	
78	*Hyphodontia sp. white, low tubercules*	Hyphodermataceae		RE	S	DW	N	BOUGHER 754	4				Y		1, 2, 3, 4	
440	*Hypoxylon bovei*	Xylariaceae		FL	S	DW	N		2		Y				2, 3	
KP116	*Hypoxylon sp. asexual phase*	Xylariaceae		FL	S	DW	N		2		Y				2	New
KP118	*Inocybe sp. 'Jarrahae'*	Inocybaceae		MU	M	L	N	BOUGHER 909	4				Y		4	New
82	*Laccaria lateritia*	Tricholomataceae	Brick Red Laccaria	MU	M	L	N	E9455	2, 3		Y	Y			1, 2, 3, 5	
KP012	*Lanzia sp. funnel, scurfy stem*	Sclerotiniaceae		CD	S	DW	N	BOUGHER 519, BOUGHER 673	2		Y				1, 2	
KP114	*Lentinus ragbag*	Lentinaceae		M	S	L	N		3			Y			3	New
293	*Lepiota ragbag*	Lepiotaceae		MU	S	L	N	E9450	4				Y		2, 4	
374	*Lichenomphalia umbellifera*	Tricholomataceae		MU	S	L	N	BOUGHER 725	1	Y					1	New
92	*Limacella pitereka*	Amanitaceae	Slimacella	MU	S	L	N	E9351	1, 3	Y		Y			1, 3	
93	*Lycoperdon ragbag*	Lycoperdaceae		PF	S	L	N		4				Y		4	
KP117	*Lyophyllum sp black stem*	Tricholomataceae		MU	S	L	N	BOUGHER 907	4				Y		4	New
KP069	*Macrohyporia dictyopora*	Coriolaceae	waxy, white & ochre-orange, tubes	RE	S	DW	N	BOUGHER 638	1, 5	Y				Y	1, 5	
102	*Mycena kuurkacea*	Tricholomataceae	Bleeding Mycena	MU	S	L	N	BOUGHER 724	1	Y					1	
101	*Mycena nargan*	Mycenaceae	Spotted Pixie Cap	MU	S	DW	N	BOUGHER 520	4				Y		1, 2, 4	
KP044	*Mycena ragbag, chlorine, in litter*	Tricholomataceae		MU	S	L	N		1	Y					1, 5	
KP101	*Mycena ragbag, no chlorine odour, in litter*	Tricholomataceae		MU	S	L	N		1, 2	Y	Y				1, 2	New
KP045	*Mycena ragbag, on wood*	Mycenaceae		MU	S	DW	N		1, 2, 3, 4	Y	Y	Y	Y		ALL	
KP009	*Mycena sp. black cap, hairy base, chlorine odour*	Mycenaceae		MU	S	DW	N		2, 3, 4		Y	Y	Y		1, 2, 3, 4	
KP005	*Mycena sp. dark*	Mycenaceae		MU	S	L	N		1, 2, 3	Y	Y	Y			1, 2,	

Sp. ID	Species	Family	Common Name	Form	Life Mode	Micro Habitat	Native / Exotic	Voucher Code	2011 SITES	1	2	3	4	5	ALL YEARS (2009 - 2011)	New in 2011
	brown/black in litter														**3**	
KP021	*Mycena sp. small, lemon cap, strigose base, on wood*	Mycenaceae		MU	S	L	N	E9319 BOUGHER 771	**3**			**Y**			**2, 3, 5**	
110	*Omphalotus nidiformis*	Tricholomataceae	Ghost Fungus	SH	S/P	D W/ B	N	E9423	**4, 5**				**Y**	**Y**	**1, 3, 4, 5**	
219	*Panaeolus ragbag*	Strophariaceae		MU	S	L	N		**5**					**Y**	**5**	
KP108	*Parasola auricoma*	Psathyrellaceae		MU	S	D W	N	BOUGHER 748	**5**					**Y**	**5**	**New**
237	*Phaeotrametes decipiens*	Polyporaceae		BR	S	DT	N	BOUGHER 727	**1**	**Y**					**1, 2**	
120	*Phellinus sp. extensive resupinate*	Hymenochaetaceae		BR	S	D W	N	E9454	**3**			**Y**			**2, 3, 4**	
122	*Phlebia ragbag*	Meruliaceae		RE	S	D W	N	BOUGHER 511	**2, 3**		**Y**	**Y**			**1, 2, 3, 4**	
106	*Phlebia subceracea*	Meruliaceae	Golden Splash Tooth	RE	S	D W	N	BOUGHER 666	**2**		**Y**		**Y**		**2, 3, 4**	
KP078	*Pholiota highlandensis*	Strophariaceae		MU	S	BG	N	BOUGHER 647	**4**				**Y**		**4**	
KP053	*Phylloporus clelandii*	Boletaceae		MU	M	L	N	BOUGHER 646	**2, 4**		**Y**		**Y**		**2, 4, 5**	
128	*Pisolithus ragbag*	Sclerodermataceae	Dog Poo Fungus	PF	M	L	N		**1, 2, 4**	**Y**	**Y**		**Y**		**1, 2, 4**	
KP029	*Pleuroflammula praestans*	Cortinariaceae		SH	S	D W	N	E9356	**3**			**Y**			**1, 3**	
KP119	*Plicaria ragbag sessile, black*	Pezizaceae		CD	S	L	N	BOUGHER 910	**4**				**Y**		**4**	**New**
458	*Pluteus pauperculus*	Pluteaceae	Yellow Gilled Pluteus	MU	S	D W	N	E9352, BOUGHER 686	**4**				**Y**		**1, 4**	
271	*Poria s.l. ragbag*	Unknown		RE	S	D W	N		**1, 3, 4**	**Y**		**Y**	**Y**		**ALL**	
KP100	*Postia pelliculosa*	Coriolaceae		BR	S	D W	N		**1**	**Y**					**1**	**New**
KP033	*Propolis versicolor*	Rhytismataceae		PS	S	D W	N	E9383	**1. 4**	**Y**			**Y**		**1, 4**	
KP104	*Protubera canescens*	Phallogastraceae		TR	M	U	N	BOUGHER 744	**4**				**Y**		**4**	**New**
138	*Psathyrella ragbag, in litter*	Psathyrellaceae		MU	S	L	N	E9415	**1, 2, 3, 4, 5**	**Y**	**Y**	**Y**	**Y**	**Y**	**ALL**	
KP076	*Psathyrella ragbag, on wood*	Psathyrellaceae		MU	S	D W	N		**4**				**Y**		**4**	
140	*Pycnoporus coccineus*	Coriolaceae	Scarlet Bracket Fungus	BR	S	D W	N		**1, 2**	**Y**	**Y**				**1, 2, 4, 5**	
141	*Ramaria gracilis*	Ramariaceae	Slender Coral	CO	M	L	N		**1**	**Y**					**1, 4**	
KP037	*Ramaria sp. white*	Ramariaceae		CO	M	L	N	BOUGHER 745	**4**				**y**		**1, 4**	
467	*Resupinatus subapplicatus*	Tricholomataceae	Grey Anenome	SH	S	D W	N	E9379, E9422	**1, 2, 3, 4**	**Y**	**Y**	**Y**	**Y**		**1, 2, 3, 4, 5**	
262	*Schizopora paradoxa*	Schizoporaceae		RE	S	D W	N		**3**			**Y**			**3**	**New**
KP112	*Sistotrema cream to ash grey*	Sistotremataceae		RE	S	D W	N	BOUGHER 773 BOUGHER 775	**2, 3**		**Y**	**Y**			**2, 3**	**New**
KP103	*Sistotrema sp. grey paint on leaves*	Sistotremataceae		RE	S	D W	N		**4**				**Y**		**4**	**New**
KP061	*Stemonitis lignicola*	Stemonitidaceae		SL	S	D W	N		**1**	**Y**					**1**	
211	*Stereum illudens*	Stereaceae	Purplish Stereum	BR	S	D W	N	E9362	**1**	**Y**					**1**	
400	*Suillus granulatus*	Suillaceae		MU	M	L	E		**5**					**Y**	**5**	
207	*Tremella mesenterica group*	Tremellaceae	Yellow Brain Fungus	JE	S	D W	N	E9453	**1, 3, 4**	**Y**		**Y**	**Y**		**1, 3, 4, 5**	
250	*Trichia decipiens*	Trichiaceae		SL	S	D W	N		**3, 4**			**Y**	**Y**		**3, 4**	
238	*Truncospora ochroleuca*	Polyporaceae		BR	S	D W	N	BOUGHER 729	**1**	**Y**					**1, 2, 5**	
KP092	*Tubaria sp. rich red brown*	Crepidotaceae		MU	S	L/ D W	N	BOUGHER 689	**5**					**Y**	**5**	
395	*Tubifera ferruginosa*	Reticulariaceae	Strawberry Slime Mould	SL	S	D W	N		**5**					**Y**	**1, 5**	

Sp. ID	*Species*	Family	Common Name	Form	Life Mode	Micro Habitat	Native / Exotic	Voucher Code	2011 SITES	1	2	3	4	5	ALL YEARS (2009 - 2011)	New in 2011
KP105	*Tubulicrinis calothrix*	Tubulicrinaceae		RE	S	DW	N		4				Y		4	New
KP089	*Undetermined ascomycete minute dull tan discs on wood*	Unknown		CD	S	DW	N		3			Y			1, 3	
KP067	*Undetermined ascomycete minute grey discs on wood*	Unknown		CD	S	DW	N		4				Y		1, 4	
295	*Undetermined ascomycete ragbag on wood*	Unknown		CD	S	DW	N		3			Y			3	New
KP113	*Undetermined ascomycetes stromatic*	unknown		ST	S	DW	N		3			Y			3	New
KP106	*Undetermined mould ragbag*	unknown		MO	S	DW	N		4				Y		4	New
KP099	*Undetermined resupinate kahki, ochre tuberculate*	unknown		RE	S	DW	N	BOUGHER 772	1, 3	Y		Y			1, 3	New
KP095	*Undetermined resupinate smooth grey-pink tinge*	unknown		RE	S	DW	N	BOUGHER 712	3			Y			3	New
107	*Undetermined slime mould ragbag*	Unknown		SL	S	DW/ / L	N		2, 4		Y		Y		2, 3, 4	
172	*Volvariella speciosa*	Pluteaceae	Common Rosegill	MU	S	L	N		4, 5				Y	Y	4, 5	

Table 3: Taxonomic rank, life mode, habitat, and sites of fungi in Kings Park in 2011.
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	106 *(includes 9 ragbags)*	
Genera	72 *(+ 8 of unknown genus)*	
Families	43 *(+ 8 of unknown family)*	
Ecology/Lifemode types		
Saprotrophic	92	*Pleuroflammula praestans*
Pathogenic	1	*Armillaria luteobubalina*
Mycorrhizal	11	*Cortinarius ochraceofulvus*
Saprotropic or pathogenic	1	*Omphalotus nidiformis*
Main habitat types *(+ 5 species with two or more habitats)*		
B = Bark of living tree	1	*Crepidotus eucalyptorum*
BG = Burnt ground/litter	1	*Pholiota highlandensis*
DT = Diseased or dying tree/plant	3	*Fomitipora robusta*
DW = Dead wood/logs	64	*Macrohyporia dictyopora*
L = Leaf litter or soil	98	*Inocybe sp. 'Jarrahae'*
U = underground	1	*Protubera canescens*
Survey Sites		
1	17 exclusive / 14 shared	*Lichenomphalia umbellifera*
2	7 / 20	*Phlebia subceracea*
3	11/ 21	*Phellinus sp. extensive resupinate*
4	25 / 20	*Mycena nargan*
5	11 / 7	*Parasola auricoma*
Origin		
Native	105	*Pluteus pauperculus*
Exotic	1	*Suillus granulatus*


Some of the participants during the 2011 fungi survey at Kings Park.

Discussion

Biodiversity

During the 2011 survey a total of 106 fungi were recorded including 27 of the fungi in the current survey considered as new records for Kings Park – 25% of the fungi recorded in 2011. It is not possible to accurately estimate the number of fungi species known so far from Kings Park. Any estimate depends on the level of acceptance of unverified or unverifiable names as representing or not individual species, including those recorded before 2009 (Bougher 2010a, b) together with the undetermined and 'ragbag group' names recorded in surveys since 2009 (Bougher 2009a, 2010, current report).

However after the 2011 survey a total of 206 fungi (including slime moulds) named to species level have been recorded from Kings Park. This total is comprised of:

- 122 named species recorded before 2009 (Bougher 2010a).
- 72 new records that were identified to species level from years 2009 and 2010 (Bougher 2011).
- 12 of the 27 new records from the 2011 survey that were identified to species level and not recorded from Kings Park before 2011 (Current report).

Some notable fungi recorded at Kings Park in 2011

1. *Parasola auricoma* (Figure 1, see on page 2): This is a member of the ink cap group of fungi (formerly of the genus *Coprinus*) most species of which become black and inky as they mature. Like some of the other ink cap species *P. auricoma* has a smooth cap without any veil remnants. However it is unique by having long, fine, thick-walled hairs known as sclerocystidia on the cap surface and at the base of the stem. This fungus had not previously been recorded in Australia. Many of the fruitbodies observed at Kings Park in 2011 did not fully expand, and did not develop many mature spores as their basidia were mainly aborted. Often the spores present were found to be distorted. The reason for this is unknown but it is possible that the fruit body development may have been affected by fluctuating rain/weather conditions at the time, or may have been adversely affected by recent herbicide treatment of the woodchipped garden bed.

2. *Coprinellus pyrrhanthes* (Figure 2): This is another ink cap fungus. *C. pyrrhanthes* produces delicate parasol-like fruit bodies which emerge during the night, fully expand by early morning and wither away soon after. Fruit bodies may be produced in the same position over several successive days either scattered singly or in small clusters. The fruit bodies are sprinkled with dark brown crystalline granules which entirely cover

the young buttons and remain present at the cap centre when mature. It had not previously been recorded in Australia. However it was also recently found in another Perth urban bushland (at Kensington), and that collection is presented under the name *Coprinellus* aff. *pyrrhanthes* on page J-69 of the Perth fungi field book (Bougher 2009b).

3. *Protubera canescens* (Figure 3): This is one of several truffle species recorded so far at Kings Park. It occurs throughout Australia (Beaton and Malajczuk, 1986), and is usually found just below the litter often in clusters of 6 or more fruit bodies of variable size up to about 25 mm diameter. The interior has a core of olive-brown spore mass surrounded by a broad jelly-like layer. This species is featured on page I-12 of the Perth fungi field book (Bougher 2009b). Recently it has been proposed that *Protubera canescens* is an early developmental stage of the Cage Fungus *Ileodictyon*, most likely *Ileodictyon gracile* (May *et al.*, 2010).

4. *Inocybe* sp.*'jarrahae'* (Figure 4): *I.* sp. *'jarrahae'* is characterized by having a red-brown felty cap, yellowish gills, spermatic odour, and vesiculose cheilocystidia formed on long hyphae. This species has been observed in several other bushlands around Perth. It appears to be most abundant in calcareous limestone areas with shrub vegetation or Tuart woodland, but it can also occur in Jarrah forest (where it was first observed, hence the current working name '*jarrahae*'). At Kings Park in 2011 it was found growing on a limestone track near burnt Tuart woodland. Only two species of the ectomycorrhizal genus *Inocybe* (the fibre cap fungi) have been identified at Kings Park so far. The other identified species is *Inocybe violaceocaulis*, which has been collected several times in different locations in Kings Park. Many more species of *Inocybe* may be expected at Kings Park. Indeed there are two records of other *Inocybe* species at Kings Park, but no voucher specimens or notes were kept - *Inocybe* sp. 'brown' 13/06/1999 N.L. Bougher et al. (unpubl. foray data), and *Inocybe* sp. 'small fibrillose' 13/06/1999 N.L. Bougher et al. (unpubl. foray data).

5. *Macrohyporia dictyopora* (Figure 5): This is a resupinate or sometimes bracket-like fungus usually found at base of burnt trees or tree trunks, or on burnt logs. The fruit bodies are cream to bright ochre/orange with an irregularly- pored surface and they often have a very uneven growing margin. Locally, this species almost always seems to be associated with burnt wood, either on living fire-scarred trees or on burnt logs/stumps. Historical records of this fungus in other parts of Australia and New Zealand also indicate a preference for burnt wood, but there are also a few records of it from non-burnt wood.

Figure 5: *Macrohyporia dictyopora* at Kings Park

Conclusion and recommendations

A total of 206 fungi named to species level now have been recorded from Kings Park, but many more species are likely to occur there , as indicated by the numerous unidentified and 'ragbag' records. In similarity with the surveys in 2009 and 2010, this year's survey captured many new records for the Park (25% of records in 2011).

Recommendations include:

- **Surveys:** Surveys of fungi should be continued annually in order to document the diversity of fungi at Kings Park, including with continuing support from staff and volunteers. 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.
- **Taxonomic work:** Like at Bold Park, resolution of the identity of fungi at Kings Park will continue as a developmental process, with the identity of more species gradually resolved each year. Continued 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 Kings Park. However to accelerate resolution of the identity of fungi at Kings Park, financial support targeted specifically for taxonomic studies needs to be provided.
- **Training:** Further education, training, and awareness of volunteers and staff is needed in order to recognize a greater array of fungi, particularly the less conspicuous types of fungi. This will help provide a more accurate assessment of the numbers of fungi species present at Kings Park.
- **Book:** Some of the fungi recorded so far in Kings 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 Kings Park (and Bold Park) be produced, such as a colourful field book and/or pamphlets and posters.

Corrections to Table 2 in the 2010 report (Bougher 2010c)

The following have been corrected on the version of the 2010 report that was placed on the BGPA website in August 2011, but were not corrected on the version submitted to BGPA in December 2010: KP083 *Phellinus* cf. *gilvus* should read *Fuscoporia* cf. *gilva*; KP058 *Amanita fibrillosipes* should read *Amanita fibrillopes*; 71 *Henningsomyces candidus*: form should be CY not TU.

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Appendix 1

The subset of fungi that were processed, described, & lodged as herbarium vouchers from Kings Park and Botanic Garden 2011: Western Australian Herbarium (PERTH), Kensington. PERTH numbers to be assigned.

Genus	*Species*	Code	Descriptive Notes	*Plants*	Date
Agaricus	*subrufescens*	BOUGHER 00726	Characteristic Features: (i) Cap: 7 - 14 cm broad. Matures to have a flat top with a shallow central depression. Margin with a small membranous flap (1 -2 mm). Cap colour off-white with small scales (snuff brown, ref: British chart). Fleshy. Spongy, pale flesh of cap, up to 1.4 cm thick. Gills: up to 8 mm long, closely spaced, colour pale brown to to dark brown (date-brown, ref: British chart) becoming darker with age. Abundant lamellae present. Stem: 9 - 12 cm long, 1.5 cm wide, stocky, frim, cylindrical. Stem has bulbous end under the ground. Stem surface longitudinally silky. Veil: white, lacy with scales. Very fine as the mushroom enlarges and stretches the veil. See diagram on original field sheet.	*planted eucalypts*	21/06/2011
Amanita	*sp.*	BOUGHER 00746	Characteristic Features: (i) Powdery, shaggy veil and bulbous stem base; (ii) Cap 7 cm diameter, plane shaped with smooth margin and cream colour - 4D in British colour chart; (iii) Gills: adnexed, smooth margin, close, 0.8 cm deep and off-white colour, 2B in British chart. Stem: 8.5 cm long, straight, becoming bulbous with ragged annulus around top, cream / off-white colour and solid interior. Width from	*Eucalyptus gomphocephala*	30/06/2011

Genus	Species	Code	Descriptive Notes	Plants	Date
			1.5 to 3 cm. Interior becomes yellowish when exposed to air.		
Bolbitius	*titubans*	BOUGHER 00728	Characteristic Features: (i) glutinous olive-yellow cap, with wrinkled pitted centre at maturity; (ii) bright pastel yellow stem, (iii) habit in woodchipped area.	*planted eucalypts*	21/06/2011
Ceratiomyxa	*fruticulosa*	BOUGHER 00752	Characteristic Features: (i) a common decomoser slime mould often seen on dead Banksia bark. Delicate clusters of rosettes. White to soft grey, semi-translucent structures to 1 mm tall, which are mostly divided / branched into 2 or 3 branchlets. The grey coloured structures are more translucent than the whiter structures. But which are the more mature? Do the structures go from white to soft grey with age. Fruiting bodies of rosettes are spreading across the Banksia bark (dead).	*Eucalyptus gomphocephala, Banksia*	30/06/2011
Chlorosplenium cf.		BOUGHER 00732	Characteristic Features: (i) inoperculate discs with smooth dark greenish-brown outer surface and greenish yellow hymenium; (ii) no stalk; (iii) entirely dark when young; Family Leotiaceae, but may not be Chlorosplenium? Collected before. At first entirely dark dull greenish greyish brown, then expanding to develop a caramel yellowish centre with a smooth pale, entire rim. Outer surface very minutely fibrillose. Stipe absent, or very short dark tapering one (see photos), with matted mycelium at base. Maximum diameter 7 mm, and then the disc becomes wavy-undulating. MICRO: Ectal exipiculum of brown walled nearly globose not radially arranged swollen cells up to 30 microns wide but sausage hyphae also present (textura globosa). Medullary exipiculum a textura intricata - loose narrow, septate hyphae in all directions (up to 4 microns wide). Scattered bundles of septate hairs rising from the ectal exipiculum surface (see photo). Ascia: cylindric without swollen base, e.g. 11 microns wide x 180 tall; tip amyloid, truncate and with inoperculate distinct amyloid pore channel, 8 - spored No agglutination in hymenium or elsewhere. Paraphyses: cylindric-narrow filiform, smooth, e.g. 3 microns wide; not or barely projecting past the asci, unswollen and unbent at apex; sparsely septate. Spores: cylindro-ellipsoid, with sharp ends, some broader at one end, flattened on one side but not curved, smooth thin-walled, non-amyloid or dextrinoid, e.g. 17.7 x 7.3; 15 x 6.4; 14.9 x 6.2; 14.5 x 6.5; 19.1 x 7.6 microns; not septate. Sometimes minutely papillate at one end?	*Dryandra*	21/06/2011
Colus	*pusillus*	BOUGHER 00908	Characteristic Features: (i) Globose white sac up to 40 mm broad with white rhizomorphs at base; (ii) Wrinkled red appendages emerging amid kahki, foetid gelatinous material. A likely weed fungus often occuring in woodchipped garden beds around SW WA.	*Eucalyptus gomphocephala*	5/08/2011
Coprinellus	*pyrrhanthes*	BOUGHER 00733	Characteristic Features: (i) plicate delicate caps with brown patches of veil near centre. No button stage specimens seen. Section Setulosi - pileocystidia present. MICRO: veil of brown pigmented, encrusted globose elements (some thin walled and collapsing). Some hyphae and some pyriform end-cells joined to a stalk-like hypha. (see photos). Cells up to 25 microns wide. Spores: broad ellipsoid to ovoid asymmetric in side view, apiculus small but visible, germ pore non-truncate small central; smooth-walled, e.g. 9.1 x 6.6; 10.1 x 7.2; 9.6 x 7.1 microns. Pileocystidia present? Hyaline? See images, cylindric with globose swollen base? Neck e.g. 9 microns wide, base 20 microns wide. Pileocystidia are rare, scattered singly (this is evident under stereomicroscope too). Cheilocystidia globose to broad pyriform, 20 - 35 microns wide, in a broad sterile layer on gill edge. No clamps. Basidia 4-spored, e,g, 18-24 x 8-10 microns. Caulocystidia globose base, neck not tapering (is cylindrical) with or without slightly swollen apex, e.g. 80 x 9 (neck) x 11 (base) microns. See also BOUGHER 414 which is another local region collection of this species.	*Corymbia calophylla*	21/06/2011
Crepidotus	*prostratus*	BOUGHER 00749	Characteristic Features: (i) Cap 15- 40 x 15-35 mm. Top undulating with edges rolled under. Height 15 mm, round to oval in shape. Cap colour variegated fawn. Gills sepia to hazel, close, extending on stem (decurrent), smooth, rubbery. Stem short often eccentric. Grouped together. Mature specimens.	*Eucalyptus gomphocephala*	30/06/2011
Dacrymyces	*stillatus*	BOUGHER 00730	Characteristic Features: (i) globular units, bright orange, on decorticated wood. Need to confirm this ID microscopically (NLB 22 / 6/ 11). Translucent jelly. Size: approx 1m. Shape: flattened globular, single units.	*Eucalyptus cladocalyx*	21/06/2011
Galerina	*sp. brown, delicate*	BOUGHER 00723	Characteristic Features: (i) same species as at Bold Park last week (= BOUGHER 717, see that description); (ii) 5 - 10 mm cap, indented in centre, strongly hygrophanous, fawn centre in clay pink colour cap, edges complete; (iii) gills downcurved from cap to stem, pattern of 1 large gill followed by 1/4 gill with 1/2 gill, then 1/4 then 1/2 and second part of large gill. (See diagram on field sheet). (iv) stem 25 - 35 mm long - 2 mm wide evenly along whole stem, stem slightly darker but lighter towards top.	*Eucalyptus marginata, Allocasuarina*	21/06/2011
Galerina	*sp.*	BOUGHER 00747	Characteristic Features: (i) Small fruit bodies with hemispherical cap up to up to 12mm diam.; (ii) narrow dark stem with small brown scales. This = Kings Pk species code KP107. May be the same as BOUGHER770. Pileus: up to 12 mm diam., hemispherical becoming flatter but never applanate; surface dry smooth, obscurely translucent-striate; margin incurved, shallowly scalloped in some; dark brown at centre, bright orange-brown (near 6D8) towards margin. Stipe: up to 20 x 2 mm; cylindric, minute brown scabres along most of stipe length, otherwise smooth, no annular zone evident; dark red-brown (near 7F8) except paler ar apex; apex not pruinose. Lamellae: adnate to subdecurrent; edge smooth and entire, edge and face similar colour to the pileus; lamellules abundant. MICRO: Spores: ellipsoid to ovoid, smooth-walled, 7.6 x 4.9; 7.0 x 5.4 microns. No perispore or germ pore. Cheilocystidia - scattered in small clusters, cylindric, hyaline, smooth, eg. 32 x 6 microns (see image). Clamps present. Pleurocystidia rare? Similar to cheilocystidia. Caulocystidia: cylindrical, hyaline (some brown-encrusted, like some of the stipe hyphae (see image).	*planted eucalypts*	30/06/2011
Galerina	*sp.*	BOUGHER 00770	Characteristic Features: (i) chestnut brown obscurely translucent-striate pileus with some paler fibrils of veil near margin; (ii) bright brownish-yellow broadly adnexed to subdecurrent gills; (iii) stem with scurfy and longitudunally silky fibrils in upper half. This appears to be very similar to the Galerina from May Circle in Kings Park collected last week (BOUGHER747) in a woodchipped habitat. Is it the same? (check under microscope). If so it is the same as Kings Pk species code KP107.	*Spyridium globulosum, Allocasuarina fraseriana*	5/07/2011
Hohenbuehelia	*sp.*	BOUGHER 00750	Characteristic Features: (i) This may be the same species we commonly see at Bold Park e.g. at Tuart car park - "H. bingarra". Shell-shaped bracket. Diameter 3 - 22 mm. cap margins inrolled in juvenile. Sepia, glistening, semi-circular. Gills cream-buff, close, decurrent, abundant lamellae. Furry base stem on juvenile fruit bodies. Mature caps not inrolled. Wavy edge, smooth. Soft fine hairs - velvety, glistening. MICRO: Abundant large fusoid metuloids, clamps present; spores smooth, hyaline, eg. 72 x 14 microns, allantoid (broadly so). Pileipellis a trichoderm of hyphae with brown cytoplasm, overlying a broad semi-gelatinised layer of clamped loosely arranged hyphae (some ornamented)	*Banksia*	30/06/2011
Hyphodontia	*sp.*	BOUGHER 00754	Characteristic Features: (i) Fully resupinate spreading growth; (ii) white (mainly) with yellow patches; (iii) surface tuberculate to odontoid (columnar ragged apex). MICRO: cylindric spores, glassy cylindric cystidia, no clamps, dimitic. Spores cylindric in face view with slight adaxial depression in side view, smooth, hyaline in KOH greenish in Melzers (see photos); eg. 5.1 x 2.4; 4.8 x 2.0 microns. Basidia long narrow, eg. 25 x 3 microns, hyaline, 4-spored. Cylindric glassy cystidia scattered singly (see photo) eg. 45 x 4 microns. Clumps of 'hairs' (cylindric hyphae) at apex of some of the odontoid teeth (see image). No clamps seen. Some of the fruitbody has hyphae and hymenium heavily encrusted with crystalline material - especially in the	*Eucalyptus gomphocephala*	30/06/2011

Genus	Species	Code	Descriptive Notes	Plants	Date
			white coloured parts of the growth. The white 'subiculum' appears comprised of glassy septate non-clamped skeletal hyphae. So it is probably a dimitic fruitbody. (see images)		
Hyphodontia	*breviseta*	BOUGHER 00774	Characteristic Features: (i) cream resupinate fruit body, with dense arrangement of short tubercules mostly without or barely divided apices. Probably the same species (perhaps H. breviseta) as commonly found at Kings Park, often forming extensive sheets on fallen Banksia wood.	*Eucalyptus*	5/07/2011
Inocybe (Mallocybe)	*sp. "jarrahae"*	BOUGHER 00909	Characteristic Features: (i) Felty brown cap up to 25 mm diam; (ii) Yellow gills when young, duller when older; (iii) Yellowish stem sparsely scurfy- fibrillose (not pruinose); (iv) Spermatic odour (cut open some specimens to test this). A common species in SW WA it seems (see other collections descriptions), e.g. at Bold Park in 2011. This species seems to proliferate in semi-disturbed areas - particularly where there is bare limestone or sand. It remains to be tested as to whether similar-looking collections from forest areas (e.g. under karri at the Porongorups in 2011 = BOUGHER???) are the same species as the limestone / sand collections. Note in this collection there are two very young buttons - under high power lens it can be seen that there is a cortina present - sparse dull whitish fibrils that are rapidly evanescent, but sometimes leaving a fine pale appendiculate margin on some of the younger specimens.	*Eucalyptus gomphocephala, Acacia*	5/08/2011
Lichenomphalia	*ericetorum*	BOUGHER 00725	Characteristic Features: (i) Long stemmed, delicate fungi growing in shade. Size: caps up to 12 mm, stems to 30.2 mm; Colour: Caps: No 12 fulvous, dark in centre to pale edges (mature), paler when immature. Stems: gills pale 12, uniform. Consistency: firm, stem flexible. Caps: centrally depressed. Gills: upswept, forming a rounded 'V', attached approximately at right angles. Substrate: litter. See diagram on field sheet.	*Dryandra*	21/06/2011
Lyophyllum	*sp.*	BOUGHER 00907	Characteristic Features: (i) Pileus up to 25 mm diameter; dark chestnut brown, black at centre and fading as drying, obscurely translucent-striate, smooth upturning and undulating from quite young stage; (ii) Stem dark brown (almost black), smooth, dry, often flattened, 20-35 x 2-5 mm; (iii) Gills dull cream, broadly adnexed, smooth edge, crowded, edge smooth entire and concolorous with the face. Broadly ellipsoid/ ovoid, smooth walled hyaline spores less than 6 microns long (see micro photos), and spore print appears white not pinkish. Possibly genus Lyophyllum - dried material quite dark?	*Eucalyptus gomphocephala*	5/08/2011
Mycena	*kuurkacea*	BOUGHER 00724	Characteristic Features: (i) Size: 70 - 45 mm tall, cap 9 - 5 mm high; Shape: long slender stem, cap conical umbellate; Colour: cap clay pink, apex of cap darker, stem paler, immature caps darker - dark brick; Gills: some gills long, some short, colour lighter than clay pink, not attached to stem.	*Banksia sp.*	21/06/2011
Mycena	*sp.*	BOUGHER 00731	Characteristic Features: (i) translucent-striate cap with clay-buff to paler margin and with a pale central spot; (ii) applanate when mature. Cap: 4 - 13 cm wide to 0.2 - 0.3 cm wide (deep?). Colour is pale pink to darker clay buff (ref: British chart) grading to the centre of the cap with a pale centre spot. Cap opens flat. Cap is translucent such that the gills can be seen throught the top. Margin of older specimens wavy. Stem: 3 - 4.5 cm long and and very thin in width (0.1 cm). Colour of stem pale pink-brown, getting darker near the base at ground level. Base of thickly matted white hairs. Upper stem is silky. Gills: long and short gills (lamellae) - close. Colour of gills pale pink - brown. Gills attached to stem, adnate.	*Dryandra*	21/06/2011
Mycena	*nargan*	BOUGHER 00751	Characteristic Features: (i) Cap: 0.2 cm to 1.6 cm broad, parabolic to slightly umbonate, striated at edge , smooth and a little sticky. Immature specimens have powdery white spots on cap. Pale sepia colour No 26 British colour chart; Gills: Close adnexed, margin smooth, light cinnamon colour 0.3 cm deep; Stem: Thin and delicate in mature specimen. Short and bulbous in immature specimen. Light cinnamon colour in mature specimen. 0.1 cm diameter. 6 cm long. Hollow in centre. Diagram.	*Banksia*	30/06/2011
Mycena	*sp. yellow cap*	BOUGHER 00771	Characteristic Features: (i) wax yellow cap when young; (ii) spindly often contorted stem with abundant strigose hairs in lower half; (iii) shallow crowded gills with entire margin; (iv) habit usually deep within the litter attached to woody debris. A common species in Perth's urban bushland. This = Kings Pk species code KP021. Pileus: 5 - 20 mm diam; hemispherical when very young, soon expanding to convex, campanulate often with undulating margin, finally applanate and upturning at the margin; surface smooth with a very minute white frost in parts when young; bright pastel yellow (near 2A4- 2A5) entirely when young intensifying to greenish yellow colour near centre (near 4B5); margin thin, entire, not translucent-striate. Stipe: 15 - 6- x 1 - 2 mm; often sinuous, otherwise cylindrical or often flattened; with minute whitish pruinosity (easily removed), smooth except for lower half with abundant bundles of white strigose hairs up to 3 mm long; extending all the way to the base; pale lemon yellow (concolorous with the gills). Lamellae: very shallow (less than 1 mm deep); subdecurrent; crowded; white when young, cream to pale lemon yellow when mature; edge and face concolorous; edge smooth and entire; lamellules abundant in two tiers.	*Allocasuarina fraseriana*	5/07/2011
Parasola	*auricoma*	BOUGHER 00748	Characteristic Features: (i) Smooth (no cystidia) but fine scattered hairs can be seen on button under stereomicroscope, radially grooved cap, fusoid-cylindrical, never fully expanding; (ii) Not becoming inky, but collapsing; (iii) stem silky fibrillose but not pruinose; (iv) attached to woody debris. This is section Auricomus: no veil; no cystidia on pileus or stipe but with thick-walled hairs (sclerocystidia) on pileus and at base of stipe. According to Ulje, Parasola auricoma is the only species that of that section, and it seems that this species has not been recorded previously in Australia. BOUGHER 748 fits that species well and I think it just has a problem affecting the development of spores and basidia, hence the odd-shaped and few spores. Pileus: up to 20 mm diam. When mature; fusoid-cyclindric expanding slowly and reluctantly to convex-campanulate (not expanding to applanate); surface smooth entirely to the naked eye, radially grooved except at centre from early age; colour dark chestnut (near F78) when button, caramel (near CD6) then darkening to dull brown with an increasing grey tinge; without copious ink but deliquescing by collapsing. Central pale tan spot persisitng at maturity. One fruit body did expand fully. Stipe: up to 40 x 4 mm; cylindric with undifferentiated and smooth base, surface densely longitudinally silky in button, finely shiny silky (under lens) when mature; no annulus; no pruinosity anywhere; hollow. Lamellae: loosely adnexed, up to 2 mm deep; crowded; edge minutley fimbriate and paler than face; Basal mycelium: a collar of strigose white hairs (persistant at maturity but most conspicuous in button). MICRO: Pileipellis a hymeniderm (see photo), no cystidia but with scattered long brown hairs 2-3 microns wide x 150 microns long, thick-walled, some finely verrucose. Clamps present. Cheilocystidia vesiculose to utriform with pedicel, eg. 42 x 23; 70 x 38; 39 x 20 microns (see photos), with basal clamp. Spores; very few (as the basidia seem mostly aborted and mis-shaped spores are present, basic shape seems to be lentiform in face view, ellipsoid(?) in side view. 11.7 x 10.6; 13.9 x 11.4; 13.5 x 9; basidia 4-spored; eg. 23 x 13 microns, The brown hairs are also present on base of stipe (see macro and micro photos). Pleurocystidia very scattered and infrequent.	*planted eucalypts*	30/06/2011
Phaeotrametes	*decipiens*	BOUGHER 00727	Characteristic Features: (i) lilac, large-pored hymenium; (ii) hard, woody consistency; (iii) dark brown, obscurely zoned upper surface.	*Allocasuarina fraseriana*	21/06/2011
Plicaria	*sp.*	BOUGHER 00910	Characteristic Features: (i) Black, smooth, cupulate at first then undulating and often deeply torn at the margin; (ii) Black under-surface, smooth to minutely dimpled; (iii) Short tapering round-based black stipe up to 4 mm tall to 5 mm wide.	*Eucalyptus gomphocephala,*	5/08/2011

Genus	*Species*	Code	Descriptive Notes	*Plants*	Date
				Acacia	
Protubera	*canescens*	BOUGHER 00744	Characteristic Features: (i) Body 5 mm to 33 mm diamter. Globose shape with thin 1 mm peridium, 18 - 24 mm central spore body surrounded by gelatinous, greyish, 4 - 8 mm thick layer. Radially arranged white sutures. Spore body light clay buff (31 - 32 English chart). The surface of the peridium is white, not bruising with some adhering rhizomorphs. Gleba globose up to 24 mm thick.See diagram.	*Eucalyptus gomphocephala, Xanthorrhoea*	30/06/2011
Psathyrella	*sp.*	BOUGHER 00755	Characteristic Features: (i) stem: 4 mm diameter, 4 cm to 1 cm high. No veil. Colour: pale cream/grey. Hollow stem. Cap: 3 cm to 1 cm. Height of cap 8 mm - 7 mm. Shape: Cap convex, flattening out a little with age. Colour: Gills - milky coffee (No 28), edge is paler - smoke grey (No 34). Cap - snuff brown (No 17) edge, centre is 'clay buff' No 32. Gills: crowded, adnexed.Texture: leathery	*Acacia*	30/06/2011
Ramaria	*stricta cf.*	BOUGHER 00745	Characteristic Features: (i) Can be white when unearthed in the field, but becomes yellower with age; (ii) white rhizomorphs; (iii) slender, small; (iv) favours rich, woody-organic mulch often near bansksia wood; (v) micro: rough-walled spores. Spores ellispoid, verrucose, pale in KOH, e.g. 6.2 x 3.6; 6.6 x 3.6; 5.9 x 3.9. microns; Appears to be very close to Ramaria stricta, but that has larger spores. Compact, coral like fungus with many branched extensions - 1 to 5 cm tall; clumps clustered together, up to 6 cm wide. Colour is pale creamy going light brown as it dries and ages, and darker colour close to base where it is growing in the litter. Base/ stem/stipe - 1.0 to 5.0 mm wide and slightly flattened. White mycelium entangled with within the sandy litter attached to the bottom of the stem. Branches dividing mostly above 1 to 2 cm above ground level. Branches are flattened in cross section - solid not hollow.. Tip of branches with several projections all terminating at about the same level. See diagram on original field sheet.	*Eucalyptus gomphocephala*	30/06/2011
Sistotrema	*sp. grey*	BOUGHER 00753	Characteristic Features: (i) velvety, very thin, easily removed, fully resupinate growth on very wet leaves. Seems quite common around Perth's bushlands but not conspicuous as it is usually on mist leave well buried under litter.	*Eucalyptus gomphocephala*	30/06/2011
Sistotrema	*sp. cream*	BOUGHER 00773	Characteristic Features: (i) fully resupinate, cream, minutely farinose to cottony surface; (ii) margin undifferentiated (just thins out); (iii) no rhizomorphs; (iv) firmly attached. This = Kings Pk species code KP112. Same species as BOUGHER775. Spores fusoid, hyaline, smooth-wallled, e.g. 7.3 x 3.4; 6.6 x 3.0 microns (see photo). Broad clamped hyphae with branching at right angles. Few mature basidia seen but they are 6- or more spored, and urniform. Similar microscopically to BOUGHER 775.	*Allocasuarina fraseriana*	5/07/2011
Sistotrema	*sp. ash grey*	BOUGHER 00775	Characteristic Features: (i) pale ash grey fully resupinate. This = Kings Pk species code KP112. Same species as BOUGHER773. Spores: fusoid, boletoid with prominent apiculus and strongly adaxially assymetrical, smooth-walled, e.g. 7 x 2.7; 7.7 x 3.1 microns, pale brown in Melzers, hyaline in KOH. Clamps present, including on rhizomorph-like strands (see photo) of broader thick-walled but smooth hyphae 8 - 10 microns wide. Branching at right angles. Basidia cylindric to urniform, clamped, probably at least 6-spored (but hard to tell as all basidia seem collapsed). No cystidia.	*Banksia*	5/07/2011
Truncospora	*ochroleuca*	BOUGHER 00729	Characteristic Features: (i) stout compact bracket, orange brown except with white thick-lipped margin; (ii) broadly attached to the wood; (iii) bluntly zonated; (iv) with small buff pores. Bracket is 35 x 25 x 22 mm. Pore circular and uniform in size (approx 1mm?). Colour upper clay pink in semi-circular lines (ref: Royal Botanic Garden Edinburgh?) pores buff. Micro: dextrinoid ellipsoid, thick-walled, smooth spores with truncate apex with germ pore; e.g. 16.8 x 9.4; 17.5 x 8.9; 15.4 x 8.3;15.2 x 8.6; 18.0 x 9.5; 18.7 x 9.5 microns. See photos.	*Eucalyptus marginata, Allocasuarina, Banksia*	21/06/2011
Undetermined resupinate	*smooth, grey with pink tinge*	BOUGHER 00712	Characteristic Features: (i) ash grey with slight violaceus tinge (fading); (ii) smooth, thin, easily removed, farinaceous in parts (not contiguous but with small gaps throughout); (iii) margin not differentiated ; (iv) no rhizomorphs. Micro: No clamps, candelabra-type arrangement in hymenia (branches at right angles); monomitic; basidia quadrisporic. This collection matches Kings Park fungi code KP095.	*Banksia sp.*	11/06/2011
Undetermined resupinate		BOUGHER 00772	Characteristic Features: (i) dull ochre colour (in between 5D4 and 6D4) with greenish tinges near the smooth thin margin; (ii) surface irregularly tuberculate (different sized round-topped warts unevenly spaced); (iii) easily removed from the wood; (iv) no rhizomorphs. This = Kings Pk code KP099, and is macroscopically similar to BOUGHER719 from Bold Park but that has larger spores (see photos). Micro: spores cylindric-ellipsoid, smooth-walled, hyaline in KOH, eg. 4.8 x 2.4; 5.5 x 2.5 microns; Golden greenish in melzers (see photo), but no really destrinoid contents. Cystidia scattered singly, cylindric, glassy, smooth-walled, emerging. Basidia: narrow, clavate-cylindric expanding at apex, sterigmata large and curved, 4-spored, e.g. 29 x 4 microns. Monomitic without a differentiated subiculum. No clamps seen. Many contorted elements in among the basidia (see photo), with short blunt branches.	*Acacia, Allocasuarina*	5/07/2011