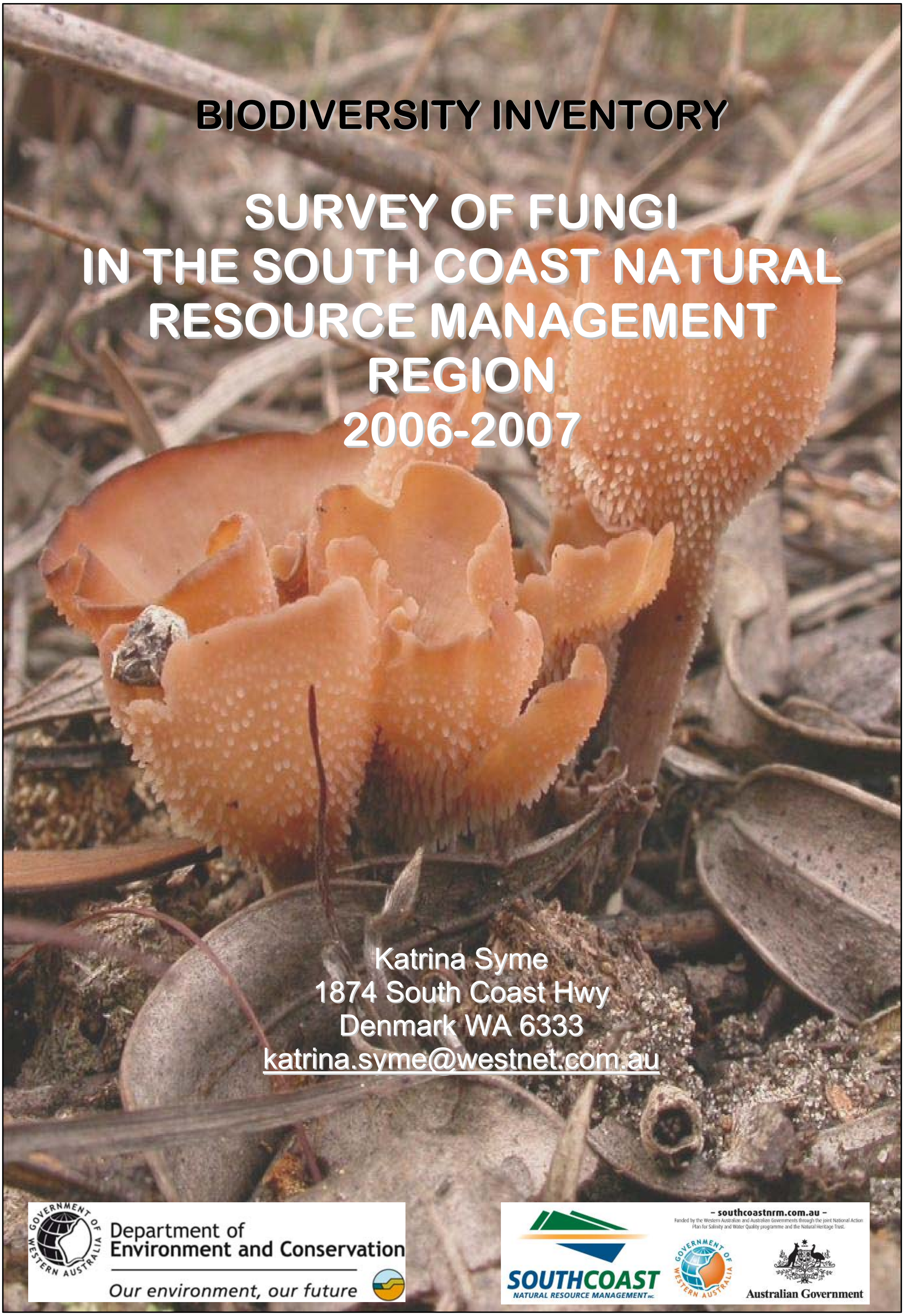

BIODIVERSITY INVENTORY

SURVEY OF FUNGI IN THE SOUTH COAST NATURAL RESOURCE MANAGEMENT REGION 2006-2007

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Our environment, our future

– southcoastnrm.com.au –
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SOUTHCOAST NATURAL RESOURCE MANAGEMENT INC

Australian Government

Biodiversity Inventory
Survey of Fungi in the South Coast Natural Resource Management Region of Western Australia, 2006-2007

Contents

This report has been prepared for South Coast Natural Resource Management Inc. and the Department of Environment and Conservation (DEC Albany).

The report should be cited as: Syme, K. (2008) *Fungi Survey of the South Coast Natural Resource Management Region, 2006-7*. Department of Environment and Conservation, Albany.

Cover page: *Auriscalpium barbatum*

1 Summary

Effective conservation and management depends greatly on our understanding of biodiversity. Our current knowledge of the South Coast's biodiversity is focussed on vertebrate fauna and vascular flora, with little known about other components such as fungi, despite being one of the most diverse groups of organisms globally. This survey of fungi in the South Coast region of southern Western Australia was undertaken as part of the Biodiversity Inventory Program under the direction of South Coast Natural Resource Management Inc.

Due to the lack of knowledge of fungi in the region and the forecast dry weather conditions, this survey was conducted opportunistically following rainfall in targeted areas of undisturbed bush, including Nature Reserves, National Parks, Crown Land and Land for Wildlife Properties.

This fungi survey was conducted during the fungi fruiting seasons over two years. Severe drought conditions in the first year, 2006, precluded surveys in the targeted areas in the north and north-eastern parts of the Region. In the subsequent year (2007), rainfall was still below average in most of the Region - particularly the woodlands and mallee in the wheat belt and pastoral areas. However, excellent results were achieved by surveying opportunistically in both years.

In 2006, fungi were recorded on 43 days and collected from as far afield as Cape Le Grand National Park in the east, Truslove Nature Reserve in the north-east; Ravensthorpe, Hopetoun and Fitzgerald River National Park in the centre of the Region; West Cape Howe and William Bay National Parks in the west and from Wamballup and Warrinup Nature Reserves in the Kent-Frankland Subregion to the north-west. In 2007, fungi were recorded on 45 days; with (as in the previous year) some records being made whilst on private outings. The focus of surveys was the centre of the region, particularly the biodiversity-rich Stirling Range National Park and State and Private Conservation Reserves north-west of Fitzgerald River National Park. The Two Peoples Bay Nature Reserve was also included.

Overall, 2,521 sighting records of fungi were databased – 1,302 in the first season and 1,219 in 2007. From these, 632 fully documented collections were dried and packaged for microscopic examination. Many have already been lodged in the Western Australian Herbarium.

Among the collections made from the Region in 2006 and 2007, 175 could be matched to known species with formal names and a further 447 were recognised as being distinctive and were given informal names. Analysis of fungi data was made on these 622 distinguishable taxa. Identification to genus and species often required both comprehensive field notes and extensive microscopic examination. There had not been enough time to complete microscopy on all the fungi collections made in the first year and although more time was allocated the next year, work on recording micro-characters still remained to be done at the end of 2007.

The detailed field notes made for each collection will facilitate taxonomic treatments on the collections. To date, one new species, ***Porpoloma griseum*** ms (May & Syme) is at manuscript stage and a number of other undescribed species have been set aside for detailed taxonomic treatment.

Interesting finds include ***Auriscalpium barbatum*** (cover page), previously only known in the Region from the type collection made by Roger Hilton near West Mt Barren in the 1970's and ***Lyophyllum* sp.** (Fig. 1) found at Two Peoples Bay and Culham Inlet, west of Hopetoun. The 'wax-cap' fungus ***Hygrocybe watagensis*** (Fig. 2), found on private property near Denmark in 2006, was otherwise only known from the type collection made in 1987 in the Watagan State Forest, eastern New South Wales. An increased range was also recorded for ***Dermocybe* sp. 'pink'** (Fig. 3) an undescribed species found for the first time in 2006 on private property north-east of Ravensthorpe and then in 2007 at Camel Lake Nature Reserve north of the Stirling Range. During the joint scientific expedition to Cape Knob Peninsula late in the second year, the western-most occurrence of ***Lycoperdon stellatum*** (Figs. 4 & 5) and the eastern-most location of ***Amanita flaviphylla*** (Fig. 6) were recorded and the first collection (identified to date) made of the genus ***Rhodocybe*** (Fig. 7).

Truffle-like fungi were not searched for specifically (surveys for them are of necessity more time-consuming and invasive), but the discovery of them across the region is testament to the former presence of now endangered – or extinct – mycophagous marsupials. Among the 38 truffle species identified, an increased range is indicated for ***Torrendia inculta***, found north-east of Ravensthorpe and on private property near Munglinup, and ***Torrendia grandis*** (Fig. 8), found on Salt River Rd on the northern boundary of the Stirling Range National Park. Both truffle-like species had previously only been recorded from near Kellerberrin in the eastern wheat belt, 300 or more kilometres away. ***Aseroe rubra*** (Fig. 9) was recorded once during the survey. The first sighting in Western Australia of this historically significant species had been made in a nearby location in 2005.

The species most commonly seen was ***Pisolithus albus*** (sensu Bougher & Syme) (Fig. 10), which fruits on the sides of paved roads very early in the year, so was only recorded in the second year, when surveys began three months earlier than in 2006. It was impossible to record all the fruitbodies seen, but an estimate was made on a private trip from the western perimeter of the South Coast region to the town of Walpole, when 118 fruitbodies were recorded over 108 kilometres in 51 locations.

Recommendations from experience gained from this fungi survey, and arising from data compiled, include that microscopy and keying out of fungi collections made during the survey be completed, images of identifiable species be added to the existing updateable field guide, images and information be made available on CD-Rom, and that fungi surveys need to be extended over several seasons in order to pinpoint rare and threatened taxa.

Fig. 1 *Lyophyllum* sp.

Fig. 2 *Hygrocybe watagensis*

Fig. 3 *Dermocybe* sp. 'pink'

Fig. 4 *Lycoperdon stellatum* (Immature)

Fig. 5 *Lycoperdon stellatum* (mature)

Fig. 6 *Amanita flaviphylla*

Fig. 7 *Rhodocybe* sp.

Fig. 8 *Torrendia grandis*

Fig. 9 *Aseroe rubra*

Fig. 10 *Pisolithus albus*

Examples of fungi mentioned in Section 1

2 Background

In 2003, the South Coast Natural Resource Management Inc. (formerly the South Coast Region Initiative Planning Team) commissioned a technical report on the status of knowledge of fungi in the South Coast Natural Resource Management Region. This report, *Fungi Information for the South Coast Regional Natural Resources Management Strategy* (Syme, 2004), served as Background Paper No. 3 to the South Coast Regional Strategy for NRM - Southern Prospects 2004 - 2009. Management Action Target B5 of the Strategy identified the following Management Action:

- Develop and commence regional biodiversity inventory program including native vegetation and its ecological condition, and lower order flora and fauna including fungi, bryophytes and terrestrial and aquatic invertebrates, including roles, ecological functions and requirements
- Conduct systematic survey of fungi, bryophytes and terrestrial and aquatic invertebrates
- Investigate and identify fungi species that should be included under EPBC Act (1999) or State legislation as threatened, endangered, etc.

This report deals with surveys for fungi made during 2006 and 2007, conducted as part of the Biodiversity Inventory Program, as part of addressing Action Target B5.

2.1 Region

The South Coast Natural Resource Management Region covers a land area of more than 6 million hectares, plus a marine area extending to the 3 nautical mile limit (Fig. 11). It includes the catchments of all the southerly-flowing rivers from Walpole in the west to beyond Cape Arid in the east (a distance of over 800km), as well as some internally drained areas north and east of the main towns of Albany and Esperance. It has been divided into six sub-regions – Kent Frankland and Albany Hinterland in the west, Pallinup North Stirling and Fitzgerald Biosphere in the centre and Esperance Sandplain and Esperance Mallee in the east. Since the first boundaries were set, the Region’s extent has been expanded, particularly in the east and north-east.

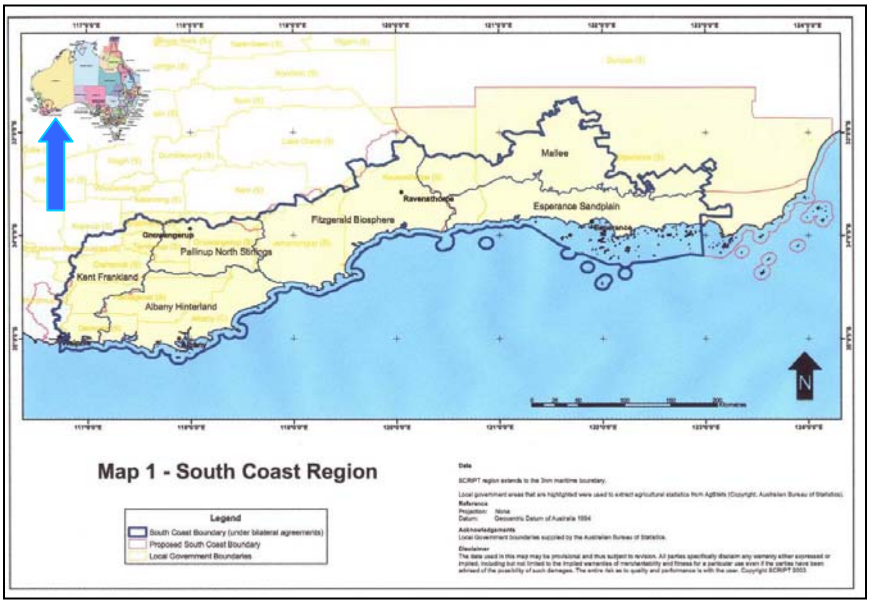


Fig. 11 Map showing the Location of the South Coast NRM Region its six subregions

The Region is renowned for its spectacular landscapes, including tall forest areas in the west, the southern coastline and many offshore islands, all of south WA's mountain peaks, and many inlets, estuaries, waterways and wetlands. Around 70% of the Region is made up of agricultural landscapes and includes most - or all, of ten local government areas. Rainfall across the region ranges from annual averages of around 1200mm in the extreme south west, decreasing to a low of 300 mm in the north-east. The Region has extremely high levels of biodiversity, with more than 20% of the State's floristic diversity (vascular plants) within the Region, and is part of the only internationally recognised global hot spot for biodiversity that occurs in Australia.

2.2 Project and objectives

The basic question addressed in this project was: *‘What fungi grow in the South Coast NRM Region?’*

A Steering Group was formed in May 2006 to plan the fungi surveys. During a number of meetings held during May and early June, various approaches were discussed. Haste was needed, as the fungus season was already well under way. Initially, it was thought best to sample plots in different vegetation types in each of the ecozones across the region in areas where least was known of the macrofungi. A range of habitats in undisturbed bush including Nature Reserves, National Parks, Crown Land and Land for Wildlife Properties were selected. But, because a dry year had been forecast, the final method decided upon was opportunistic surveying following rainfall in the targeted areas. It was agreed that, in the light of the lack of data on fungi throughout most of the Region, an opportunistic survey method would produce the best outcomes in terms of value for money and time spent, in aiming to build a properly documented inventory of fungi in the South Coast NRM Region.

Fungi can be conveniently divided into macrofungi and microfungi on the basis of the size of their fruiting structures. Macrofungi are those species that form a readily visible (>1mm) fruiting body on which spores are produced. (May, 1997). The microfungi are fungi such as moulds, mildews, leaf spots, rust fungi and smut fungi, and whose fruiting bodies are not readily visible to the naked eye; they are therefore much more difficult to survey and fall outside the scope of this survey. Most fungi are microfungi, but the macrofungi are a conspicuous and important component of biodiversity, and comprise many thousands of species.

This fungi survey is part of the Biodiversity Inventory Program, an initiative of the South Coast Natural Resource Management Inc. (South Coast NRM), which is being managed by the Department of Environment and Conservation (DEC) in Albany.

2.3 Current knowledge of fungi and challenges in gaining knowledge

The study of Australian macrofungi presents a number of challenges. There is a widespread ignorance of them and the crucial role they play in nutrient cycling and the maintenance of healthy ecosystem functioning (Syme, 2004). Good management of ecosystems would be best served by a thorough knowledge of the organisms contained within them, and how they interact to make a viable whole. Most of our native plants, including orchids, thrive in our nutrient-poor soils because they have beneficial fungal partners. Fungi also provide food for native mammals such as Gilbert’s Potoroo and beetles (Houston, 2007). Much still remains to be learned about fungi, the role they play and their association with major habitats. Greater knowledge of fungi species, their numbers and their distribution would give a truer picture of the biodiversity of the region and add inestimable value to the case for preservation of dwindling habitats. Interestingly, recent research on fungi genetics reveals that many fungi genera actually evolved in ancient Gondwana.

On current evidence, it seems that most macrofungi probably have a broad range across the southern temperate regions of the continent and that most species found in southern Australia are endemic to Australia (May, 2002, Grey & Grey, 2001). Having short-range endemic species would attract more interest it seems – but, in fact, any research on fungi gains significance when such a (comparatively) small amount is being conducted throughout the nation as a whole. Any macrofungi with restricted geographic or ecological distributions are less likely to have been collected and identified, given the fragmented approach to survey for fungi across Australia to date, which has often been driven by visits from overseas mycologists, rather than any systematic effort at regional levels (May & Pascoe Historical chapter in Fungi of Australia 2A).

In mid-2006, the number of fungi specimens (including microfungi) lodged in the Western Australian Herbarium comprised one fiftieth that of vascular plants (department of C.A.L.M. Annual Report 2005-2006). Around 80% of the State’s vascular plants have been formally named, in contrast to half the estimated 10,000 species of macrofungi (and 2% of all fungi). Indeed, it is only very recently that a mycologist has been employed at the Herbarium. Other than the work currently being conducted through the DEC Science Branch, Manjimup, much of the knowledge of the region’s fungi has been acquired by international specialists and through volunteer effort – for example through the Australia-wide community-based Fungimap (Inc.) which has been actively providing information on fungi through workshops and conferences, some of which have been held in the South Coast NRM Region.

Fungi and invertebrates comprise more than 90% of Australia's biodiversity (excluding marine life and other micro-organisms). However, the South Coast NRM Region of WA appears to be the only such organisation to commission a report on fungi for technical input into the Region's Strategy development as part of the Commonwealth and State Government's investment in Natural Resource Management.

Unlike many other organisms which can be photographed, collected and preserved then documented at a later stage, the documentation of fruiting bodies of macrofungi present a more challenging prospect.

- The emergence of their fruiting bodies is unpredictable, relying on the right soil moisture - and to a lesser extent, on temperature. In addition, many species only produce fruiting bodies sporadically.
- In many cases (particularly for mycorrhizal fungi) hyphal systems of single species (bearing the same DNA) may cover many hectares, therefore fruiting bodies can appear almost anywhere.
- Features of almost all freshly-collected fungi - colour, veils, and friable particles necessary for identification are invariably lost or altered when they are preserved, so fungi must be described as quickly as possible. This means that only a small number of different taxa can be collected at a time.
- Macro descriptions of each fresh collection can take up to an hour; specimens must then be dried, labelled and packaged, so at least half the time in field work is taken up with this task.
- Because most species have high water content and decay rapidly, they need to be dried soon after gathering. Power is needed to run a fan-forced drier, making field work in more remote regions problematic.
- If accurate records are to be made, microscopy on the fungal tissue, requiring use of a compound microscope, is needed - and an adequate amount of time must be allocated for this task (many of the fungi lodged at herbaria have been either misidentified or remain unidentified, making it difficult to calculate accurate numbers of species).
    - Examination of the micro-characters of fungi, however, means that new species can be isolated and targeted for taxonomic descriptions, rather than lying for decades in herbaria.
- There are no modern guides for a significant proportion Australian macrofungi, such as pored fungi (including boletes), gasteromycetes (including earthstars and puffballs), or truffle-like fungi. Information on other groups, such as agarics, is scattered in numerous publications in the technical literature.

3 Methodology

3.1 Survey locations

This fungi survey was conducted during the fungi fruiting seasons over two years. In 2006, fungi surveys were conducted between June 8th and August 25th. In 2007, surveys began on 13th March and ended on 30th August.

In 2006, the focus was on the eastern and northern subregions where least was known. Survey sites were selected with the assistance of Annabelle Bushell, SCRIPT Biodiversity Support Officer, who drew up maps highlighting target areas. The westernmost boundary was set at Calyerup Rocks in the north-west corner of the Fitzgerald River National Park, with an allowance made (because of the predicted drought) for sampling in areas in the west of the Region, where there would be more likelihood of finding specimens. Fruiting became sporadic after August and the last official field survey, to the Pallinup River area, was made on August 25th. Nine more records were added in September and two in December.

In 2007, the surveys concentrated on the Stirling Range and the 'FitzStirling' area east towards Fitzgerald River National Park, including Nature Reserves and Bush Heritage/Greening Australia Reserves. Pootenup and Wansborough Nature Reserves, south of Tambellup, were visited on a round trip to the Stirling Range. As on the previous year, a day trip was made to Warrinup and Wamballup Nature Reserves in the Kent Frankland subregion. Surveys ended in 2007 with a joint scientific expedition to the Cape Knob Peninsula south west of Bremer Bay.

Twelve more records, including two collections, were added in September and incidental sightings and collections made near Denmark, Walpole, Hopetoun and Ravensthorpe were also included (Table 1).

In all, sightings and collections were made at 417 GPS locations across the regions (not including sites visited where no fungi were found). Even though sampling was opportunistic, fungi were collected in a considerable variety of vegetation types across the Region, ranging from tall closed forest of *Eucalyptus diversicolor* and *E. jacksonii* to open low heath and including *Eucalyptus wandoo* woodland and thickets of *Melaleuca uncinata*. All six subregions were sampled, some to a much greater extent than others. Main survey sites are shown in the table which follows, and examples of vegetation types from each subregion shown in Fig. 12.

Sub region	Main survey sites where fungi were recorded
Esperance Sandplain	Cape Le Grand National Park
	Condingup Townsite Reserve
	Esperance: Land for Wildlife properties – D&J Ford, Myrup Rd; 'Naranda Springs', Merivale Rd
	Gibson: Helm's Arboretum; Helm's West
	Munglinup: Land for Wildlife, Caravan Park; 'Dallinup Creek, Rockhole Rd
Esperance Mallee	Kau Rock Nature Reserve
	Mt Burdett Nature Reserve
	Norwood Rd Nature Reserve
	Truslove Nature Reserve
Fitzgerald Biosphere	Bremer Bay: Cape Knob Peninsula
	Fitzgerald River National Park: Calyerup Rocks, Culham Inlet, East Mt Barren, Hamersley Drive, Mt Maxwell
	Hopetoun – Springdale Rd, Phillips Rd
	Lake Shaster Nature Reserve
	Ravensthorpe: Cocanarup Timber Reserve & Cocanarup Road west; Moir Rd; Mt Short; Overshot Hill Nature Reserve; Chambers family Land for Wildlife, 'Yoorooga'
	FitzStirling area: Private (Gondwana Link) Conservation Reserves – 'Chereninup'; 'Nowanup', 'Peniup'
	FitzStirling area: Corackerup Nature Reserve; Peniup Nature Reserve
	Boat Harbour
	Quaalup Homestead & surrounds
Pallinup North Stirling	Camel Lake Nature Reserve
	Ongerup – Jerramungup Rd
	Stirling Range National Park – Red Gum Springs; Stirling Range Drive; White Gum Flats; Yetemerup Spring
	Stirling Range Retreat
	Tambellup – Pootenup Nature Reserve; Wansborough Nature Reserve
Albany Hinterland	Albany: Mt Martin Botanic Reserve, Two Peoples Bay
	Denmark - Land for Wildlife: AJ & K Syme, L & R van der Waag; Loc 3298 west of McLeod Rd; Mt Hallowell Reserve; Mt Lindesay National Park (Little Lindesay); Mt Shadforth Reserve; William Bay National Park
	Manypeaks – South Coast Hwy
	Nornalup - Walpole-Nornalup National Park
	Pallinup River (Wellstead Crossing)
	Porongurup National Park
	Stirling Range National Park: Talyuberlup,
	West Cape Howe National Park
Kent Frankland	Lake Poorarecup
	Warrinup and Wamballup Nature Reserves
	Walpole Nornalup National Park – The Knoll, Mt Clare

Esperance Sandplain

John Eyre walk, Rossiter Bay, Cape Le Grand National Park: *Eucalyptus cornuta* and coastal heath.

Helm's West, adjoining Helm's Arboretum, Gibson: closed tall scrub of *Allocasuarina, Lambertia, Adenanthos*.

'Dallinup Creek', Munglinup: a wide range of fungi found under *Melaleuca uncinata* group

Esperance Mallee

Truslove Nature Reserve south of Grass Patch: tree Mallee and open heath.

Norwood Rd Nature Reserve west of Mt Burdett: very open shrub Mallee and open heath.

Near Mt Burdett Nature Reserve north-east of Esperance: *Eucalyptus tetraptera Hakea* and *Allocasuarina*

Fitzgerald Biosphere

Lake Shaster Nature Reserve east of Hopetoun: open shrub mallee and open heath.

Cocanarup Timber Reserve west of Ravensthorpe: *Eucalyptus occidentalis*, *Acacia acuminata.*

Corackerup Nature Reserve in the current Gondwana Link area: a variety of species of shrub mallee.

Pallinup North Stirling

Stirling Range National Park from Mt Barnett looking west: closed shrub mallee.

Camel Lake Nature Reserve near Salt River Rd: open shrub mallee.

Pootenup Nature Reserve north east of Cranbrook: *Eucalyptus wandoo* and *Acacia acuminata*.

Albany Hinterland

West Cape Howe National Park, Bibbulmun Track: coastal heath and *Eucalyptus marginata.*

Two Peoples Bay Nature Reserve, Wave Sign Gully Track: coastal heath with *Gastrolobium* and *C.calophylla* in the gullies.

Porongurup National Park: *Eucalyptus marginata*. The Park was closed as it was not safe.

Kent Frankland

Wamballup Nature Reserve: open woodland of *Eucalyptus wandoo.*

Warrinup Nature Reserve on the Frankland-Cranbrook Road: *Eucalyptus wandoo* and Macrozamia.

Walpole-Nornalup National Park, Mt Clare: Tall closed forest of *Eucalyptus jacksonii* and *E. diversicolor.*

Fig. 12 Examples of vegetation types from each of the six subregions

The Permit Process:

In order to conduct this fungi survey, permits from the Department of Environment and Conservation (DEC) were required to collect fungi (licence for Scientific or other prescribed purposes to collect Flora or Fauna) on DEC land (Regulation 4 Authority to *Enter DEC Land and/or Waters).* As these permits took more than six weeks to obtain from the Wildlife Licensing Branch of the Department of Environment and Conservation, this project commenced before they arrived, and therefore the first surveys were conducted on private property or land not under the jurisdiction of the Department.

Before the fungi survey was conducted, written permission was obtained from the DEC and Shire Councils on whose land field work might have taken place. At least forty eight hours prior to embarking on each field survey, the Regional DEC office (Albany in this instance), the District Managers and relevant Park Rangers were informed of the intended field work.

Field Survey:

Field survey trips were planned depending on rainfall (the Australian Bureau of Meteorology website was regularly checked). At each site, a short foray for fungi was made. If no fungi were spotted within 15-20 minutes, the survey moved on to the next site. Hundreds of digital photographic images were taken of fungi, vegetation and survey sites.

All the fungi seen were recorded. When unidentified fungi were found, providing they were in reasonable condition and even if there was only one fruiting body, a collection was made so identification could be attempted on the dried specimen at a later date.
All collections suitable for the Western Australian Herbarium will be formally lodged when microscopy is completed.

For each sighting (including collections), the following records were made:

- The date, ecozone, area, place, soil type, substrate, vegetation, vegetation condition & GPS location recorded approx. every 50m)
- The name of each species and number of fruiting bodies
- Photographs of fungi, locations and vegetation were taken where possible
- Each page was numbered

For each collection

- A field code number was assigned
- A photograph *in situ*, was taken where possible
- Specimens were wrapped in waxed paper and stored in lidded plastic containers to prevent desiccation and damage.

At base:

As most fungi samples have high water content and decay rapidly, collections of them needed to be documented and dried on the same day they were gathered.

Collections were carefully sorted and cleaned, and

- assigned a unique number, fruit bodies were sectioned and placed on grey board with a scale bar, then photographed using a flash attachment (Fig. 13)
- where applicable, a spore-bearing surface placed on white paper labelled with the unique collection number, in order to collect mature spores and record fresh spore colour
- macro descriptions were written

Preservation of collections involved

- drying collections separately until thoroughly desiccated on trays in a fan-forced dehydrator
- packaging in a sealed plastic bag together with spore print and label
- grouping in tens and packing into large, labelled sealed bags for easy access later

Hygrocybe sp.

Nothocastoreum cretaceum

Fig. 13 Photographs of collections of fungi

Cataloguing of images

In order to facilitate the future production of field guides and CD-Roms, Adobe Lightroom software was purchased and used to catalogue images in various groups and subgroups. This proved very time-consuming, however, and was not completed by the end of the project.

Categories used were:

- Fungi collections (in groups of 100)
- Locations
    - o Locations where fungi were recorded, including vegetation and landscapes
- Fungi taxa
    - o Using the same categories as in Richard Robinson's updateable field book

Distribution maps

Maps showing the range of occurrence of some taxa were produced for use in Power Point Presentations given during the survey period (Fig. 14).

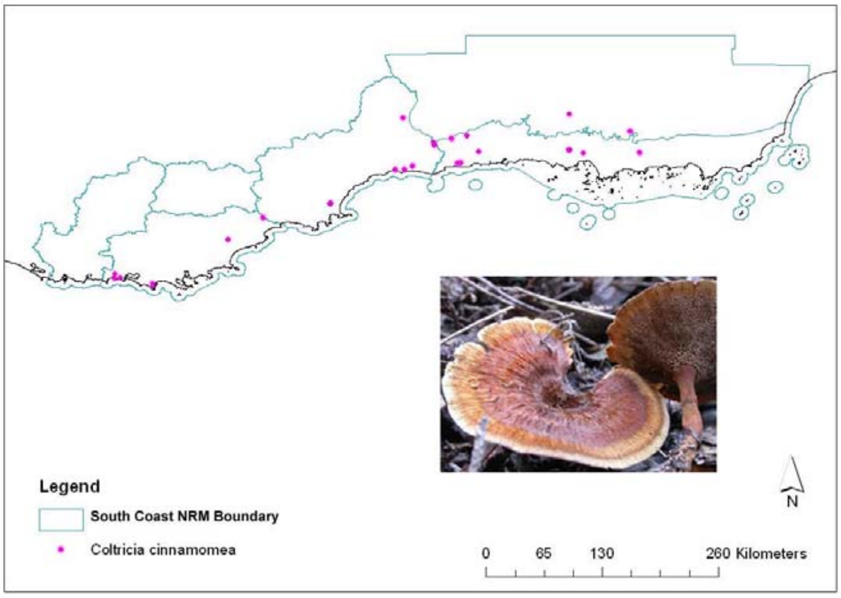


Fig. 14 The range of *Coltricia cinnamomea* across the Region in 2006

Field equipment	Equipment needed at base
Trowel, rake, knife, bucket or bag, small brush	Laptop computer, battery, cable
waxed lunch wrap, plastic containers, esky (for storing collections & keeping them cool)	Spore print paper, data sheets, unique number tags
Field notebook and pencils & sharpener	Cutting board; fine, sharp knife, scissors
GPS; Maps	
Sterilising solution for field gear & shoes (anti-Phytophthora) First Aid Kit	Daylight lamp, photography grey board, SLR camera with flash
Camera, tripod, battery, cable Mobile 'phone, battery, cable	Fan-forced drier, trays, extension cords, multi-outlet power block
Wet weather gear	Zip-lock bags, marker pens

Field work in the FitzStirling area

Dehydrated and packaged fungi collections

3.2 Preparation and identification

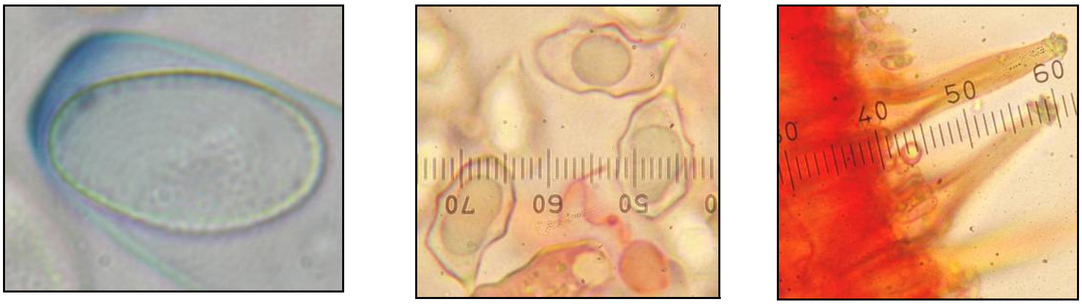
Some fungi could not be identified to genus in the field, and a larger number could not be identified at species level - for which microscopic detail was needed. Significant time was spent at this task, during which 282 collections were examined. There was insufficient time available to assign all the collections to species, but most of the collections which could not be identified to genus in the field, were able to be assigned to genus after microscopic examination.

Microscopy

When using keys as an aid to the identification of unknown taxa, it is necessary to record microscopic detail with a compound microscope, for which specific mounting media and stains, as well as immersion oil, is required. Some microscopic features recorded are shown in Fig. 15.

The method used for lamellae (gills):

- thin sections were cut using a razor blade (working under a binocular microscope was helpful)
- Iodine solution (Melzer's Reagent) was used to test for reactions on spores and trama
- sections were rehydrated in a 3% KOH solution and examined under water and using stains (e.g. Congo Red)
- the stained section was placed on a slide in a small amount of KOH and a cover slip placed over it
- cross-sections of the lamella (gill) were examined for arrangement of lamellar tissue, presence and placement of cystidia (x400)
- the cover slip was tapped in order to separate the cells
- spores, basidia, trama and cystidia were measured and drawn using a camera lucida under oil (x1000 magnification)



Blue reaction with Melzer's solution at tip of ascus on a species of *Peziza*

Angular spores of a species of *Entoloma*

Metuloid pleurocystidia on the gill face of a species of *Inocybe*

Fig. 15 Diagnostic features indicating particular genera after staining and examining lamellae (gills) at high magnification.

Identification

Various references were used to aid identification and some newly-published reference books were purchased. Although some papers were supplied by a number of mycologists, it was difficult to access all of those which were needed.

'FunKey' (a program currently being developed and which was supplied by Dr Tom May, Royal Botanic Gardens Melbourne) was used to identify some of the fungi to genus. Feedback was supplied so the efficacy of the program could be gauged and adjustments made. An updated version was provided in mid-December, 2007.

3.3 Data analysis

Data were entered into an Excel database under headings such as Collection Number, Date, Genus, Species, Fruit Body Numbers, Ecozone, Area (general), Place (specific), Soil Type, Substrate, Vegetation, Vegetation Condition, Latitude and Longitude. More categories were added as the need arose.

For fungi, where species had not been formally named, descriptive field names were assigned. Where known (but not formally described) fungi were previously recorded in the 'Jarrah Forest Fungi' informal field book compiled by Verna Tunsell (Robinson 2006, 2007), those names and species numbers were utilised. Species not included were given numbers followed by 'K' which referred to collection numbers made by the author of this report, and a few had numbers followed by 'KS' where no prior collections (by the author, or by Richard Robinson) had been made.

Vegetation:

For vegetation, during the first year, it was realised that information on vegetation should have been entered in a more systematic way, and this problem was dealt with before the commencement of the 2007 survey, when a table adapted from Muir (1977) and Aplin (1979) was employed.

3.4 Collaboration and assistance with identification

Assistance received

A number of mycologists and specialists helped with identification of some of the more difficult taxa. It is expected that names of species of *Ramaria*, *Laccaria* and corticioid fungi will be provided in due course by those experts who were sent specimens. During visits to Melbourne, time was spent at the Royal Botanic Gardens Melbourne with Dr Tom May and Dr Teresa Lebel (both of whom were of assistance during the survey) and descriptions, microscopy and drawings of *Porpoloma griseum* ms (Fig. 16), a novel species from the South Coast Region of Western Australia and Mt Arapiles, Victoria, were prepared for publication (May & Syme, in prep.). Work also commenced on other species collected in the second year. Dr Mark Brundrett directed queries on a Glomalean truffle-like fungus (Fig. 18), to specialist Dr Chris Walker (U.K.), then at

the University of WA. Corticioid fungi (Fig. 20) were sent to Heino Lepp, an associate of the National Botanic Gardens, Canberra, who provided provisional names. Dr Ceri Pearce offered assistance with identification of microfungi on leaves and was sent specimens collected during the Cape Knob expedition.
Dr Richard Robinson sent copies of his Jarrah Forest Field and Forest Check field book compiled by Verna Tunsell, who also assembled and sent the 2006 South Coast fungi images into a separate book.
Dr Neale Bougher provided a list of fungi collections made in the South Coast region in 2007.

Information, data or material provided

- Dr AM (Tony) Young, (Blackbutt, Qld) and Nigel Fechner (Brisbane Herbarium) were sent images, data and specimens of *Ramaria* (Fig. 17) for doctoral studies.
- Dr Tom W. May (Royal Botanic Gardens, Melbourne) and Dr Gregory M. Mueller (Department of Botany, the Field Museum of Natural History, Chicago, Illinois, USA): were sent images, data and duplicates of collections of *Laccaria* and *Hydnangium* (Fig. 19) for taxonomic research.
- Images of *Auriscalpium barbatum* and dried collections were sent to Dr Richard Robinson (Forest Mycologist, D.E.C. Manjimup) for collaborative research on the stipitate hydnaceae. Images and data were included on a poster presented at the Eighth International Mycological Conference, Cairns (Robinson, Syme, May, Fielder & Lebel, 2006).
- Images of fungi were provided on request for presentations and publications by other groups in the Region.

Fig. 16 *Porpoloma griseum* ms

Fig.17 *Ramaria* sp.

Fig. 18 Glomalean truffle-like fungus

Fig. 19 *Hydnangium* sp.

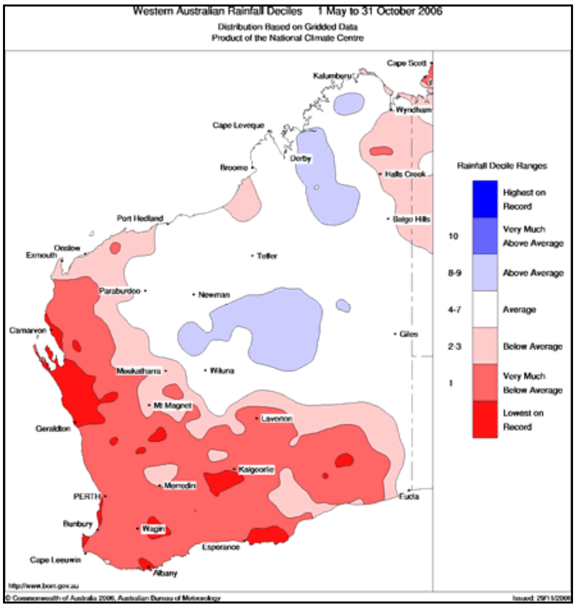
Fig. 20 *Phanerochaete* sp.

Examples of taxa referred to in Section 3.4

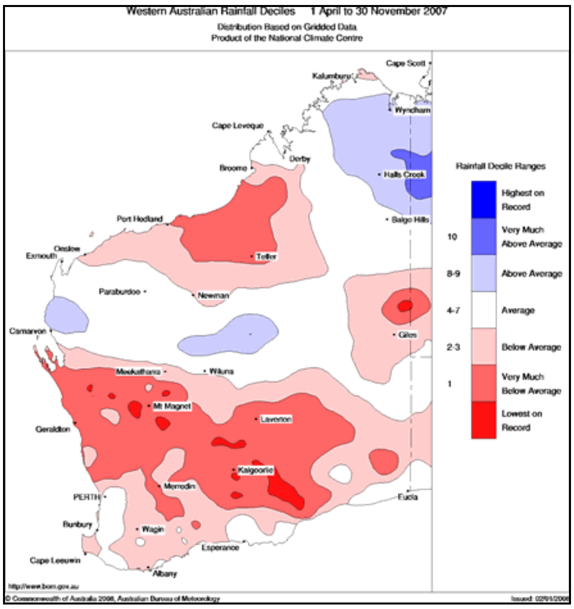
3.5 Factors affecting survey outcomes

Climatic restraints

Fungi produce fruiting bodies when there is sufficient moisture in the substrate in which they grow. The year 2006 was exceptionally dry in the south of Western Australia, especially during the survey period. Rainfall deciles computed by the Bureau of meteorology for W.A. show that rainfall in the South Coast Region was either very much below average or the lowest on record (red) during 2006 and generally below average over a similar period in 2007. (Fig. 21)



1 May – 30 October 2006



1 April-30 November 2007

Fig. 21 Bureau of Meteorology maps showing rainfall deciles during the survey periods

Limitations of the study

Firstly, it needs to be borne in mind that the project was intended simply as an inventory of fungi and that the sampling effort was not standardised between sites. For example, there was a low sampling effort for truffle-like (sequestrate) fungi. In addition, vegetation data was collected differently between 2006 and 2007.

4 Results

4.1 Summary of data

Records made between 8th June 2006 and 16th September, 2007

In all, 622 distinct species were able to be identified in the field or through collections by the end of the project, 175 of which were formally named species (including one at manuscript stage) (Table 1).

Table 1. Summary of records

Fungi	2006	2007	Total
All records	1,301	1,217	2,518
Fruiting bodies (approx.)	10,324	12, 327	22,651
Documented collections	363	268	631

All calculations of data have been made on identifiable taxa.

Fully documented collections of fungi

Over the survey period, 631 documented collections were made, but after examination under the compound microscope, two were discounted (one was a Lichen and the other was immature, so identification was not possible). A further two were discarded. One had gone mouldy, and the other was mycelium, and not a corticioid, or skin fungus, as had been thought. One collection of sequestrate (truffle-like) fungi proved to be two species and the collection was divided in two.

These collections include 497 distinct species, of which only 93 are formally named. A number of the collections require further research before final figures of described and undescribed taxa can be determined. Such work would include preliminary microscopy on collections which haven't yet been examined and more thorough microscopy, where necessary, on other collections.

Frequency of occurrence

For the 622 distinct species, the numbers of observations for each were compiled to determine which were frequently, and those rarely seen (Fig. 18). By far the majority of species (60.1%) were only recorded once, and 86% of species were recorded five times or less. Some species had as many as 82 records, but each category above five records is represented by no more than ten species (1.6%) and all categories of records of 19 or more are each represented by only one species (Fig. 22). Images of 3 species are shown in Fig. 23.

The very steep drop off in frequency of records is exactly the same pattern as found by May and Avram (1997) based on an analysis of herbarium specimens of 724 species of macrofungi from Victoria, where 80% of species were represented by five or less collections. They concluded that this sample of Victorian macrofungi was therefore insufficient to detect rare species on the basis of low frequency, because it was not possible to distinguish rare from common species among the many species with few herbarium specimens.

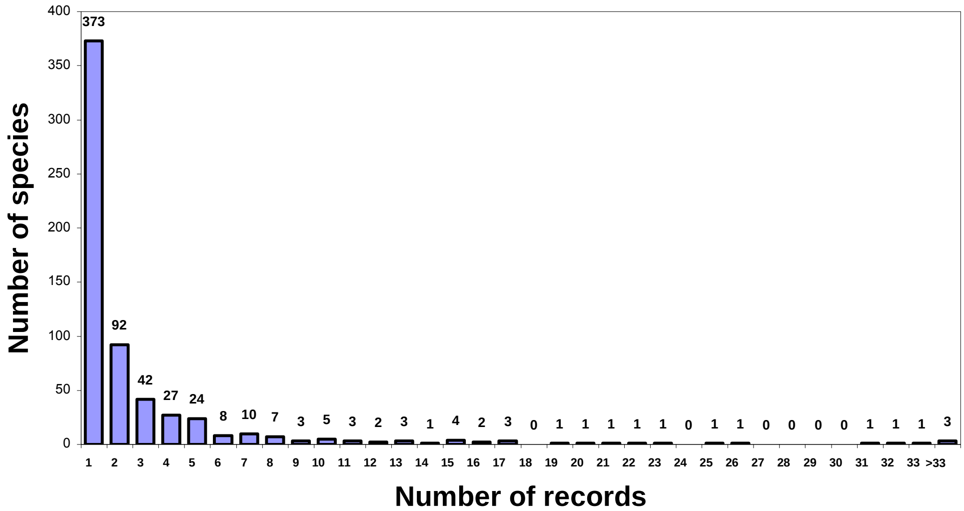


Fig. 22 Frequency of occurrence of fungi taxa

Pycnoporus coccineus, 82 records

Coltricia cinnamomea, 69 records

Clitocybe sp. 'patterned cap' , 1 record

Fig. 23 Species records referred to in Section 4.1

Species accumulation over the two years of the survey
The total number of species recorded over the two years has steadily risen, with new species found each year, a pattern demonstrated by Catcheside and Catcheside (2005) in fungi surveys from five representative sites in South Australia (and where the curves are continuing to trend upwards after seven years). In the histogram shown below, when the line becomes horizontal this represents periods when no surveys were conducted, such as between the main fruiting seasons in 2006 and 2007 and shorter periods where either no surveys were done or few fungi were found (Fig. 24).

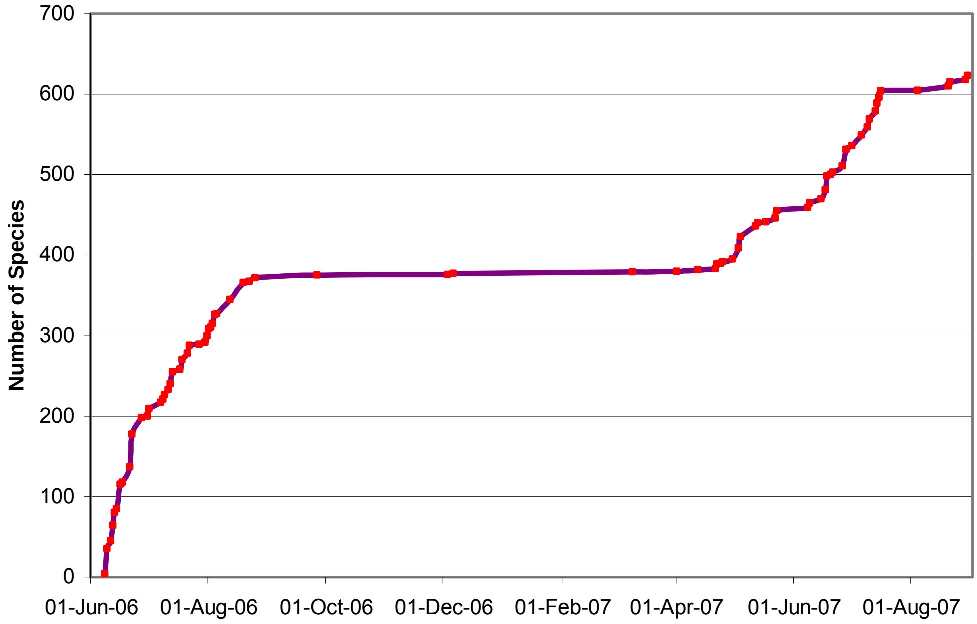


Fig. 24

4.2 *Occurrence of fungi on soil type, in vegetation type or associated vegetation*

Substrate and life mode

Of the 2,518 sightings recorded, most fungi were found on soil. The majority of these, such as *Ramaria capitata var. capitata* (Fig. 25) are mycorrhizal (forming beneficial partnerships with plants), while others are saprophytes (decomposers of organic matter) emerging from buried wood or humus. Other, such as *Panus fasciatus* (Fig.26) are found on organic matter such as wood, leaves or twigs. A few macrofungi are parasitic and *Armillaria luteobubalina* was one such species recorded, however, most parasitic fungi are microfungi, and a small number of them were collected – *Aecidium* (a rust fungus on *Dampiera* sp.), leaf spot fungi on plants such as Eucalypt (Fig 27), and *Hypomyces chrysospermum* (Fig. 28) a mould which parasitises some species of pored fungi.

Most fungi were found in Eucalypt-dominated vegetation, others with Melaleuca or Agonis. Some grow in *Eucalyptus marginata* (Jarrah) forests but have not been recorded under *E. diversicolor* (Karri). Multivariate analyses would reveal more about these relationships. The Australian Oyster fungus *Pleurotus australis* was only observed growing on species of Agonis at Two Peoples Bay. Some fungi recorded, such as *Psilocybe musci* and *Rickenella fibula* (Fig. 29) grow only in moss, while others, such as *Psilocybe coprophila* (Fig. 30), are only found on kangaroo dung. Some such life modes are already known, but more is yet to be learned.

Fig. 25 *Ramaria capitata* var. *capitata*

Fig. 26 *Panus fasciatus*

Fig. 27 Unknown microfungus on *Eucalyptus doratoxylon*, Bremer Bay

Fig. 28 The parasitic microfungus *Hypomyces chrysospermum* on a bolete.

Fig. 29 *Rickenella fibula*

Fig. 30 *Psilocybe coprophila*

4.3 Survey efforts in the South Coast NRM Region prior to 2004

In the earlier report (Syme, 2004), numbers of fungi from each sub-region were listed. Three subregions, Albany Hinterland, Kent Frankland and Esperance Sandplain had received the most mycological attention, but it was stated in the report that true numbers were impossible to gauge because

- data may have included duplicates of the same collection lodged in different herbaria (it was not possible to eliminate such duplication from the data as provided by herbaria)
- some collections lodged as ‘sp.’ would readily key out to named species, but no effort had been made to do so
- descriptive terms used for undescribed taxa such as ‘ashy cap’, by virtue of being informal tags by the collectors, are not used consistently and the same undescribed taxon could be lodged by different collectors with different informal names.

Of the 378 named taxa recorded from the region prior to the 2004 report, 166 were recorded again during the survey period. However, comparisons must be tentative without thorough research on herbarium collections made in the region.

4.4 Records in each of the six subregions

The number of species recorded from each subregion varied from 31 for Esperance Mallee to 403 for Albany Hinterland (Fig. 31). Quite a bit of this large difference in diversity across different subregions is due to differences in sampling effort, since by far the most surveys were in Albany Hinterland. Most species (75%) are known from only one subregion. Again, at least some of this pattern is likely due to difference in sampling effort across subregions. In addition, the overall sampling effort (as indicated by the frequency distribution for the number of records of each species, would have been insufficient to detect all species present in even those subregions with the most surveys.

Some well-known, common and widespread species such as *Pycnoporus coccineus* and *Amanita xanthocephala* were recorded from most or all subregions. However, other species with known widespread distributions across southern Australia, such as Fungimap target species (Grey & Grey 2005), were found in only one subregion. Examples of species found in one subregion that would be expected to occur elsewhere include *Volvariella speciosa* (only reported from Esperance Sandplain) and *Ileodictyon gracile* (only Fitzgerald Biosphere). Therefore it is not possible to separate out species genuinely restricted to particular subregion, from those species that are merely under-recorded.

It is noteworthy that nearly 80% of the species that are restricted to one subregion are not formally named, which is a higher proportion than for all the species covered by the survey, where 72% are un-named. It is possible that the more widespread and distinctive species are those that have been named first, and that if there are any restricted species, these are more likely to be un-named, because they have so far escaped notice. However, detection of truly rare or restricted taxa (whether named or not) will only be possible when a much larger dataset is assembled, that has sufficient sampling effort across all vegetation types and subregions.

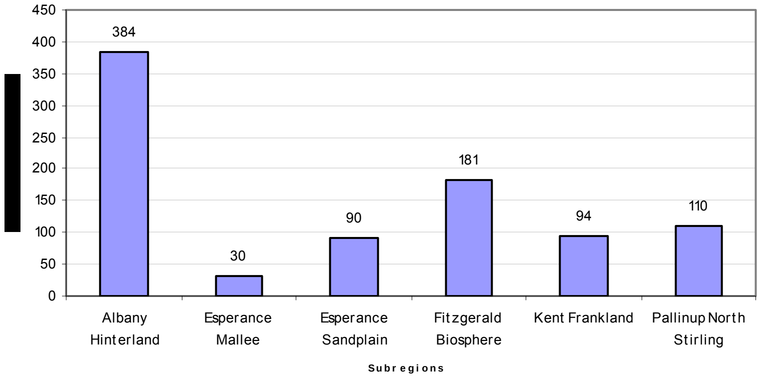


Fig. 31 Total number of identifiable species recorded from each subregion

4.5 Geographic range of identifiable species

Of the 622 identifiable species, 466 were recorded in only one subregion, 83 in two, 33 in three, 23 in four and 14 in five subregions. Three species - *Coltricia cinnamomea*, *Pycnoporus coccineus* and *Rhodocollybia* sp. aff. *butyracea*, were recorded in all six subregions, but a further 25, including *Amanita xanthocephala*, *Rhodocollybia* sp. aff. *butyracea* and *Anthracophyllum archeri* were observed from Kent Frankland in the west to Esperance Sandplain or Esperance Mallee in the east and therefore have an equally broad range. A number of species, such as *Xerula australis* (Esperance Mallee) and *Volvariella speciosa* (Esperance Sandplain) have previously been recorded in the far west of the Region But no firm conclusions can be drawn on distribution until more comprehensive fungi surveys are conducted in the Region..

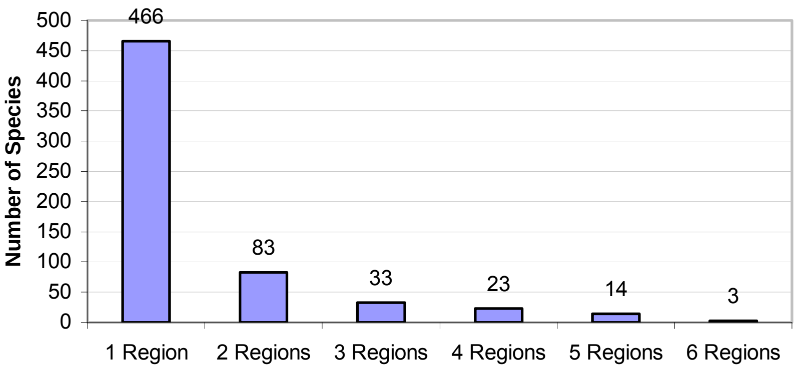


Fig. 32 Chart showing the geographic range of identifiable species across the South Coast NRM Region

4.6 *New species identified*

Although it has only been possible to pinpoint a small number of undescribed taxa with absolute certainty to date, many distinctive taxa are yet to be compared to taxonomic reference material and more extensive microscopy is required. It is certain that large numbers of undescribed taxa exist in these, and previous collections from the South Coast Region (Fig 32). So far, time has limited work to one distinct taxon, *Porpoloma griseum* which is at manuscript stage, while microscopy and DNA testing on other collections is in process.

Cortinarius sp., Chereninup Reserve (Gondwana Link)

Boletus sp., Stirling Range National Park

Fig. 33 Examples of new species identified during the survey.

The two genera containing the most numerous species were Cortinarius (Fig. 34), with 79 distinct species of which 14% were identified as formally named, and Amanita (Fig. 35), with 40 distinct species, of which 22% were identified as formally named. (Fig. 33)

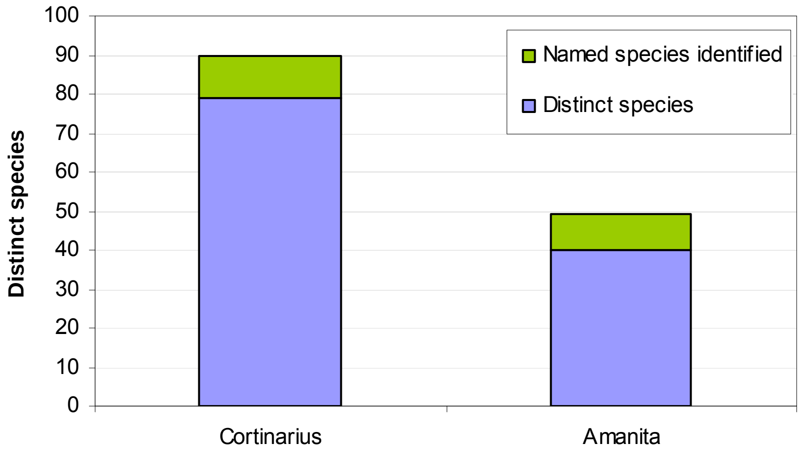


Fig. 34 The two most common genera showing the number of formally named species

Identification of the distinctive species

Great care was taken to make sure that each of the unnamed species listed as distinctive really was different. Within each species there is considerable natural variation in the colour and size of fruitbodies. In addition, the colour, or features such as viscidity, fugitive particles on cap and stem can also change dramatically when fruit bodies dry out or mature. It takes experience to recognise variations significant in discriminating species, or what is merely the normal range of variation within a species caused by genetic or environmental factors.

Ten species of *Agaricus* (*Agaricus bisporus* is the cultivated mushroom) were recognised as distinctive. Three were named species and after consulting available literature, a further seven species appeared quite distinct. Examples follow of the different macro- and micro-characters observed in four of the distinct, unnamed, *Agaricus* species.

Agaricus sp. 'brown fibrillose cap' 1449K (Fig. 36) was collected in old pasture adjoining native scrub. It is smallish, the cap is covered with brown fibrils and it has a white stem with a small annulus (or ring). Microscopically, the spores are smooth, moderately thick-walled and 7-9 x 5-6μ in size. Two collections which appeared different macroscopically were examined under the compound microscope and found to be the same species.

Agaricus sp. 'small with red-brown fibrils' 240 (Fig. 37) grows in woodland and forests. It smells sweet, a slightly violet-brown cap and a very thin, flaring annulus on a white stem. Microscopically, the spores are 4.5-5.5 x 3.5-5μ in size and it has inflated sterile cells (cheilocystidia) on the edge of the gills. Three collections were examined under the microscope. *Agaricus* sp. 'white cap' 1906K (Fig. 38) is white with a smooth cap and was found fruiting in litter under mallee eucalypts. The immature gills are white and turn dark brown as the spores (6-7x4.5μ) mature. Unlike the other species examined, the cells inside the gills are subregular (ie slightly jumbled, not in parallel bundles). *Agaricus* sp. 'scaly stem' 1868K (Fig. 39) has not yet been examined microscopically, but its macro-characters are distinctive enough to distinguish it from other members of the genus. It was found growing in sandy soil in low woodland, and is tall and robust, with a white cap which develops rusty tinges. The stem, which has a central narrow fistula, bears large scales below the flaring annulus.

Fig. 37 Species 1449K

Fig. 38 Species 240

Fig. 39 Species 1906K

Fig. 40 Species 1868K

Species of *Agaricus* referred to in Section 4.5

5 Discussion and Recommendations

5.1 Discussion

This survey aimed to answer the question ‘What fungi grow in the South Coast NRM Region’, and an inventory of fungi, including a surprisingly large number of taxa, has been made. The methodology used for the inventory, of opportunistic surveys following rain, was the most efficient possible, and remains the best option time-wise and in economic terms until adequate records of fungi are obtained. The data represents one of the most significant datasets of fungi for a particular region in WA (and indeed in Australia) and the fungi collections are a significant resource for taxonomy. Nevertheless, the Region has been incompletely surveyed for fungi and the survey intensity is far from adequate, needing to be extended over several seasons in order to identify rare and threatened taxa.

5.2 Recommendations

1. Completion of research on the collections:
Time constraints did not allow completion of research on the extensive range of collections made during the survey and it was not possible to identify many of the undescribed taxa with absolute certainty. In addition, many distinctive taxa are yet to be compared to taxonomic reference material and more extensive microscopy is needed.

Recommendation 1:
a. That research (including microscopy and keying out) on fungi collected during the survey should be completed.
b. That existing data (including images) on previous collections from the region (many of which have not yet been identified) should be incorporated into current data.
c. That multivariate analyses be used to discover which fungi are restricted to certain vegetation types and might therefore be considered vulnerable.

2. Dissemination of information:
There is a need for information about fungi to be made more widely available.

Recommendation 2:
a. That cataloguing of images taken during the survey should be completed and, together with information about fungi and their role, should be published on CD-Rom, as posters and in booklet form, and made available to schools, DEC Park Rangers and Land care groups (for example).
b. That information from the survey should published as articles and scientific papers in newsletters and journals.

3. Field References:
The updateable field book produced at D.E.C. Science Branch, Manjimup is a useful guide. It facilitates identification of fungi which have previously been recorded in the field, given epithets and identification codes, but which might only appear every few years (and whose features might not easily be remembered). This means that records of sightings are made easier and more reliable conclusions drawn from the data obtained. Images and descriptive data of identifiable fungi made in 2006-7 and earlier, are accessible and could be added to such a guide.

Recommendation 3:
That images and descriptive field names of the identifiable species (from this survey and previous collections) which are not part of the existing field book should be included in it. Production of a more comprehensive set of information (Recommendation 2) would include all such data.

<u>4. Continuation of fungi surveys:</u>

b. Findings for the two seasons 2006/2007 represent only a small part of a rich and diverse fungi flora for the Region.

a. Macrofungi in dry woodlands and mallee remained largely unknown due to drought conditions in the survey period and to lack of previous research. Most are yet to be documented.

b. Although sampling has taken place in the Tingle Forest in the far south-west of the South Coast Region, it has not been surveyed systematically for macrofungi. Red Tingle (E. jacksonii) has a very limited range, and is likely to be a hotspot for macrofungal diversity. It is currently the focus of scientific research which does not include fungi.

c. Listing of fungi species that could be included under EPBC Act (1999) or State legislation as threatened or endangered cannot occur until surveying and identification are reasonably considered to be comprehensive.

Recommendation 4:

That surveys of fungi of the Region continue across the region with a focus on dry woodlands and mallee but with the proviso that, because of climatic restraints and the sporadic nature of the emergence of fungi, surveys should also be also conducted in other ecosystems in times of drought. This would also consolidate previous records by adding to data on poorly-collected species and images, where none exist.

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8 Appendices

Appendix 1: Species list (identifiable taxa)
Appendix 2: Sample page of micro drawings made with a compound microscope & camera lucida
Appendix 3: Sample pages of fungi description, microscopy and photograph, for one collection
Appendix 4: Map of the South Coast NRM Region, showing GPS locations where fungi were recorded

Appendix 1.

Sp. No.	Genus	species
1733K	*Aecidium*	sp. on *Dampiera*
1449K	*Agaricus*	sp. brown fibrillose cap
38	*Agaricus*	sp. small
240	*Agaricus*	sp. small with red-brown fibrils
39	*Agaricus*	*augustus*
377K	*Agaricus*	*bitorquis*
1517K	*Agaricus*	sp. brown cap, thin annulus
2067K	*Agaricus*	sp. large, with brown fibrils
1868K	*Agaricus*	sp. scaly stem
1906K	*Agaricus*	sp. white cap
33	*Agaricus*	*xanthodermus*
5KS	*Aleuria*	*aurantia*
120	*Aleuria*	*rhenana*
126	*Aleurina*	*ferruginea*
206	*Amanita*	*ananiceps*
395	*Amanita*	*basiorubra*
186	*Amanita*	*brunneibulbosa*
1375K	*Amanita*	*carneiphylla*
283	*Amanita*	*eucalypti*
448	*Amanita*	*flaviphylla*
750K	*Amanita*	*luteivolvata*
1K	*Amanita*	sp. aff. phalloides
114	*Amanita*	sp. apricot pink margin
1760K	*Amanita*	sp. blue-tinged stem
1855K	*Amanita*	sp. brown partial veil
520	*Amanita*	sp. creamy yellow, sticky cap
1675K	*Amanita*	sp. large grey-brown tacky cap
1702K	*Amanita*	sp. large tapered bulb
1730K	*Amanita*	sp. lemon cap
366K	*Amanita*	sp. long base warty white
1642K	*Amanita*	sp. pure white
1869K	*Amanita*	sp. rough stem
518	*Amanita*	sp. round bulb with short free limb
412	*Amanita*	sp. short grey-brown
1483K	*Amanita*	sp. short, with light brown cap
1808K	*Amanita*	sp. slender stemmed
1510K	*Amanita*	sp. small brown and white
391	*Amanita*	sp. small brown volvate
1872K	*Amanita*	sp. small brown, abruptly bulbed
526	*Amanita*	sp. small creamy white, membranous ring
320	*Amanita*	sp. small robust, yellow-buff, bulbous
1739K	*Amanita*	sp. small, bulbed, grey cap
389	*Amanita*	sp. sticky ivory cap
1833K	*Amanita*	sp. tiny brown, brown pv
1829K	*Amanita*	sp. volvate, powdery pv
1532K	*Amanita*	sp. warty with broad, tapered bulb
1820K	*Amanita*	sp. white
1630K	*Amanita*	sp. white and cream
2066K	*Amanita*	sp. white warts
1647K	*Amanita*	sp. white, with chambered stem
519	*Amanita*	sp. yellow brown, long stem, constricted bulb
540	*Amanita*	sp. yellow universal veil
1928K	*Amanita*	sp. yellowing gills
196	*Amanita*	*umbrinella*

6	*Amanita*	*xanthocephala*
338b	*Anthracobia*	sp.
338	*Anthracobia*	*muelleri*
509	*Anthracophyllum*	*archeri*
1793K	*Antrodia*	sp. thin maze-pored coat
313	*Antrodiella*	*citraea*
1524K	*Antrodiella*	sp. white tubed resupinate
180	*Armillaria*	*luteobubalina*
1653K	*Arrhenia*	sp. central stem
1964K	*Arrhenia*	sp. tiny fawn
1432K	*Aseroe*	*rubra*
275	*Auriscalpium*	*barbatum*
200	*Austroboletus*	*occidentalis*
1520K	*Austrohysterangium*	sp. in gummy mycelium
2056K	*Austrohysterangium*	sp. reddish bruising
522	*Austropaxillus*	*infundibuliformis*
179	*Austropaxillus*	sp. pale
436	*Beauveria*	*bassiana*
155K	*Bolbitius*	*titubans*
93	*Boletellus*	*ananiceps*
103	*Boletellus*	*obscurecoccineus*
22K	*Boletellus*	sp. maroon & brown
345	*Boletus*	sp. yellow brown, stains blue
216	*Boletus*	sp. brown/yellow pores which stain blue
1474K	*Boletus*	sp. large brown
2062K	*Boletus*	sp. non bruising, tacky fleshed
253	*Boletus*	sp. peach
350	*Boletus*	sp. pinkish yellow
1324K	*Boletus*	sp. purple white
210	*Boletus*	sp. red yellow blue
195	*Boletus*	sp. small brown
1606K	*Boletus*	sp. yellow
607	*Boletus*	sp. yellow blue
1608K	*Boletus*	sp. yellow honeycomb stem
99	*Boletus*	sp. yellow red
1853K	*Boletus*	sp. beige
9	*Calocera*	*guepinioides*
1450K	*Calostoma*	*fuhreri*
465	*Calostoma*	*fuscum*
1487K	*Calvatia*	*fusca*
1205K	*Camarophyllopsis*	sp. brown naphthalene
557	*Camarophyllopsis*	sp. yellow stinkers
580	*Campanella*	sp. tiny cream fans
463	*Cantharellus*	*concinnus*
1583K	*Cantharellus*	sp. grey
1840K	*Castoreum*	*radicatum*
364	*Chlorociboria*	*subaeruginosa*
1978K	*Clavaria*	*alboglobospora*
1571K	*Clavaria*	*miniata*
316	*Clavaria*	sp. aff. amoena
458	*Clavaria*	sp. pinkish
1756K	*Clavaria*	sp. small tough tan coral
1825K	*Clavaria*	sp. tiny beige
620	*Clavaria*	sp. yellow & apricot
93K	*Clavicorona*	*piperata*
1988K	*Clavulina*	sp. beige coral
81	*Clavulina*	sp. violet brown
1566K	*Clavulina*	sp. yellow, tiny
1493K	*Clitocybe*	*kenkulunea*

197	*Clitocybe*	*semiocculta*
1624K	*Clitocybe*	sp. brown patterned cap
1468K	*Clitocybe*	sp. fawn
1983K	*Clitocybe*	sp. waxy fawn
1814K	*Clitocybe*	sp. pink
370	*Clitocybe*	sp. pinkish tan
1557K	*Clitocybe*	sp. thin waxy cap
15	*Coltricia*	*cinnamomea*
532	*Coltriciella*	*dependens*
155	*Colus*	*pusillus*
224	*Coprinus*	*micaceus*
128	*Coprinus*	sp. basal hairs
394	*Coprinus*	sp. roo poo
1KS	*Coprobia*	sp.
1669K	*Cordyceps*	sp. blue matchsticks
1968K	*Cordyceps*	sp. creamy orange
1582K	*Cordyceps*	sp. white fluffy
674K	*Cortinarius*	*abnormis*
800K	*Cortinarius*	*alboviolaceus*
314	*Cortinarius*	*archeri*
207	*Cortinarius*	*australiensis*
173	*Cortinarius*	*basirubescens*
173b	*Cortinarius*	*basirubescens*
847K	*Cortinarius*	*erythraeus*
115	*Cortinarius*	*fibrillosus*
1337K	*Cortinarius*	*lavendulensis*
293	*Cortinarius*	*rotundisporus*
357	*Cortinarius*	*sinapicolor*
2045K	*Cortinarius*	sp. anastomosing gills
1495K	*Cortinarius*	sp. blue-grey myxacium
1976K	*Cortinarius*	sp. brown cap, chunky white stem
73	*Cortinarius*	sp. brown with purplish tints
121	*Cortinarius*	sp. brown with white margin
303	*Cortinarius*	sp. bulbous base
154	*Cortinarius*	sp. chestnut
597	*Cortinarius*	sp. chestnut with banded stem
375	*Cortinarius*	sp. chunky beige with ring and volva
1743K	*Cortinarius*	sp. convex, with striate margin
485	*Cortinarius*	sp. cream orange pale
212	*Cortinarius*	sp. dry orange bulbous
1629K	*Cortinarius*	sp. dry pale tan
1849K	*Cortinarius*	sp. fat base
255	*Cortinarius*	sp. fawn phlegmacium
2008K	*Cortinarius*	sp. grey
68	*Cortinarius*	sp. large red brown
354	*Cortinarius*	sp. lge yellow rust
1788K	*Cortinarius*	sp. minute rust brown
1741K	*Cortinarius*	sp. mustard
382	*Cortinarius*	sp. mustard large
231	*Cortinarius*	sp. orange
1912K	*Cortinarius*	sp. orange brown and fawn
257	*Cortinarius*	sp. orange brown smooth cap
1965K	*Cortinarius*	sp. orange yellow, bulbous
2027K	*Cortinarius*	sp. pale brownish cream tall cap
1599K	*Cortinarius*	sp. pale cream cap
1712K	*Cortinarius*	sp. pale purple
1260K	*Cortinarius*	sp. pinkish banded stem
98	*Cortinarius*	sp. pointy cap
515	*Cortinarius*	sp. red brown cap, lavender stem

1778K	*Cortinarius*	sp. reddish brown
1637K	*Cortinarius*	sp. rich rust cap
2023K	*Cortinarius*	sp. rivulose cap
201	*Cortinarius*	sp. robust beige white
1634K	*Cortinarius*	sp. robust orange
1643K	*Cortinarius*	sp. robust rust brown, white scales
57/34	*Cortinarius*	sp. robust with mustard gills
2025K	*Cortinarius*	sp. rust cap subdistant gills
500	*Cortinarius*	sp. rust with yellow stem
1720K	*Cortinarius*	sp. rusty with hollow stem
1674K	*Cortinarius*	sp. silky beige
1932K	*Cortinarius*	sp. silky light brown
609	*Cortinarius*	sp. sm violet
267	*Cortinarius*	sp. small brown, white stem
1740K	*Cortinarius*	sp. small dark brown cap
2048K	*Cortinarius*	sp. small purplish
1870K	*Cortinarius*	sp. small tan
1973K	*Cortinarius*	sp. speckled gills
453	*Cortinarius*	sp. subdecurrent gills
2052K	*Cortinarius*	sp. tan cap and gills
1787K	*Cortinarius*	sp. tan cap, white stem
1455K	*Cortinarius*	sp. tiny brown telamonia
1716K	*Cortinarius*	sp. tiny orange tan
1534K	*Cortinarius*	sp. tiny umbonate rusty
1589K	*Cortinarius*	sp. tiny, with orange tan centre
	Cortinarius	sp. violet brown, bean odour
1501K	*Cortinarius*	sp. violet stem
584	*Cortinarius*	sp. waxy pale cap white stem
2046K	*Cortinarius*	sp. white stem with red-brown fibrils
146	*Cortinarius*	sp. yellow and white myxacium
1935K	*Cortinarius*	sp. yellow brown
404	*Cortinarius*	sp. yellow ochre violet
237	*Cortinarius*	sp. yellow with orange brown fibrils
171	*Cortinarius*	*vinaceolamellatus*
2015K	*Cortinarius*	sp. silky rust brown
171b	*Cortinarius*	sp. vinaceous lilac
118	*Crepidotus*	*nephrodes*
61	*Crepidotus*	sp. small brown
241	*Crepidotus*	sp. white with buff centre
1515K	*Cystangium*	*sessile*
289	*Dacrymyces*	sp. tiny yellow knobs
138	*Daldinia*	*concentrica*
147	*Dermocybe*	*austroveneta*
172	*Dermocybe*	*clelandii*
340	*Dermocybe*	*clelandii 'mini'*
1072K	*Dermocybe*	*erythrocephala*
1114K	*Dermocybe*	*globuliformis*
328	*Dermocybe*	sp. brown olive
168	*Dermocybe*	sp. brown with mustard yellow gills
1737K	*Dermocybe*	sp. pink universal veil
2059K	*Dermocybe*	sp. tan yellow truffle with gills & stem
310	*Dermocybe*	*splendida*
449	*Descolea*	*maculata*
1755K	*Descomyces*	*albus*
2060K	*Descomyces?*	sp. tacky white
123	*Discinella*	*terrestris*
2017K	*Discomycete*	sp. orange
409	*Entoloma*	*incana*
30	*Entoloma*	sp. aff. sericellum

1491K	*Entoloma*	sp. black
222	*Entoloma*	sp. black with grey-white gills
1560K	*Entoloma*	sp. black with incurved margin
1956K	*Entoloma*	sp. blue grey cap
1694K	*Entoloma*	sp. blue stem
135	*Entoloma*	sp. brown
1847K	*Entoloma*	sp. brown and blue
1422K	*Entoloma*	sp. brown cap, green stem
1946K	*Entoloma*	sp. brown cap, yellow gills
1476K	*Entoloma*	sp. brown nipple
135K	*Entoloma*	sp. brown robust
347	*Entoloma*	sp. brown striate cap
1980K	*Entoloma*	sp. charcoal
1954K	*Entoloma*	sp. charcoal cap, violet stem
198	*Entoloma*	sp. charcoal with blue-grey stem
1943K	*Entoloma*	sp. charcoal with pink grey stem
1944K	*Entoloma*	sp. charcoal with yellow gills
1591K	*Entoloma*	sp. decurrent gills
471	*Entoloma*	sp. dimpled pale tan
77	*Entoloma*	sp. dull grey
1958K	*Entoloma*	sp. greenish stem
1574K	*Entoloma*	sp. minute brown
1500K	*Entoloma*	sp. minute pale tan
1842K	*Entoloma*	sp. purple & blue
2042K	*Entoloma*	sp. red/grey
407	*Entoloma*	sp. rosy
1863K	*Entoloma*	sp. sea green stem
1876K	*Entoloma*	sp. small purple
227	*Entoloma*	sp. squat brown
1618K	*Entoloma*	sp. tiny brown, clear stem
1990K	*Entoloma*	sp. white lge
159	*Exidia*	sp. greyish white
41	*Fistulina*	*hepatica*
91	*Fistulinella*	*mollis*
19	*Fomitopsis*	*lilacinogilva*
1612K	*Galerina*	sp. aff. nyula
1682K	*Galerina*	sp. brown, on wood
111	*Galerina*	sp. large tan orange
1767K	*Galerina*	sp. orange brown
1616K	*Galerina*	sp. orange tan
1573K	*Galerina*	sp. small umbonate
2KS	*Galerina*	sp. tiny Omphalina-like
1539K	*Galerina*	sp. tiny rusty drying pale
1941K	*Galerina*	sp. tiny, in sand
1728K	*Galerina*	sp. umbonate
1923K	*Galerina*	sp. umbonate, on wood
1695K	*Galerina*	sp. waxy rust cap
11	*Galerina*	sp. yellow ochre, on wood
626	*Galerina*	sp. long, thin stemmed
2021K	*Gastroboletus*	sp. yellow, red base, stains blue
1095K	*Geastrum*	*minimum*
228	*Geastrum*	sp. beaked
1609K	*Geastrum*	sp. fringed mouth
1681K	*Geastrum*	sp. pleated mouth
1731K	*Geastrum*	sp. short neck
1705K	*Geastrum*	sp. tiny, with pleated mouth
1610K	*Geastrum*	sp. wet & dry
3KS	*Geastrum*	sp. yellow crusty
312K	*Geoglossum*	*glutinosum*

1651K	*Geoglossum*	sp. short
1690K	*Geoglossum*	sp. tall, round-topped
1611K	*Gloeophyllum*	sp. aff abietinum
1774K	*Glomus*	sp. yellow centre
1945K	*Grandinia*	sp.
1004K	*Gummivena*	sp. gummy mycelium
1516K	*Gymnomyces*	*glarea*
1697K	*Gymnomyces*	sp. white, smooth spored
8	*Gymnopilus*	*allantopus*
890K	*Gymnopilus*	*eucalyptorum*
675K	*Gymnopilus*	*ferruginosus*
591	*Gymnopilus*	*purpuratus*
400	*Gymnopilus*	sp. aff. ferrugineus
1490K	*Gymnopilus*	sp. aff. parrumbalus
1664K	*Gymnopilus*	sp. greenish tints
1749K	*Gymnopus*	sp. dark red brown
309	*Gymnopus*	sp. large brown
2044K	*Gymnopus*	sp. red brown
1934K	*Gymnopus*	sp. reddish-brown cap and stem
292	*Gyroporus*	sp. aff. cyanescens
600	*Hebeloma*	*aminophilum*
56	*Heterotextus*	*peziziformis*
1631K	*Hexagonia*	*vesparia*
541	*Hobenbuehelia*	sp. aff. petalodes
1915K	*Hobenbuehelia*	sp. white
422	*Hohenbuehelia*	sp. small brown
1148K	*Humidicutis*	*viridimagentea*
1494K	*Hydnangium*	sp. compressed, elongated locules
1481K	*Hydnangium*	sp. lamellate, stipitate
591K	*Hydnangium*	sp. small pink
2013K	*Hydnangium*	sp. stubby stem+D483
87	*Hydnellum*	sp. red brown
297	*Hydnum*	sp. aff. repandum
604K	*Hydnum*	sp. chestnut
1150K	*Hygrocybe*	*austropraetensis*
317	*Hygrocybe*	*conica*
671K	*Hygrocybe*	*involutus*
445	*Hygrocybe*	*polychroma*
1613K	*Hygrocybe*	sp. aff. astatogala
1891K	*Hygrocybe*	sp. beige & white
195K	*Hygrocybe*	sp. citrus scented
1892K	*Hygrocybe*	sp. fawn
1548K	*Hygrocybe*	sp. red with orange gills
1865K	*Hygrocybe*	sp. small blackening
122	*Hygrocybe*	sp. small yellow
599	*Hygrocybe*	sp. yellow orange
564	*Hygrocybe*	sp. yellow red
684K	*Hygrocybe*	*viscidibrunnea*
1649K	*Hygrocybe*	sp. grey rubbery
1762K	*Hygrocybe*	sp. grey-brown
	Hygrocybe	*violet gills*
1530K	*Hygrocybe*	*watagensis*
100	*Hypholoma*	*australe*
59	*Hypholoma*	*brunneum*
108	*Hypomyces*	*chrysospermum*
268	*Hypomyces*	sp. orange
1614K	*Hypoxylon*	sp. bubbled brown crust
1687K	*Hypoxylon*	sp. small domes
1628K	*Hysterangium*	*inflatum*

1698K	*Hysterangium*	sp. grey green gleba
1781Ka	*Hysterangium*	sp. peeling skin
516	*Ileodictyon*	*gracile*
1470K	*Inocybe*	*arenacolens*
1	*Inocybe*	*australiensis*
398	*Inocybe*	sp. brown fibrillose
1635K	*Inocybe*	sp. chunky tan
2029K	*Inocybe*	sp. dark brown gills
1804K	*Inocybe*	sp. dark brown squamulose
1993K	*Inocybe*	sp. large
1726K	*Inocybe*	sp. off-white cap
226	*Inocybe*	sp. orange tan squamulose
169	*Inocybe*	sp. parabolic cap
1454K	*Inocybe*	sp. pitted cap
113	*Inocybe*	sp. radially fibrillose, pink stem
1477K	*Inocybe*	sp. reddish brown
1742K	*Inocybe*	sp. robust
20	*Inocybe*	sp. scaly cap
1527K	*Inocybe*	sp. short chunky beige
484	*Inocybe*	sp. short chunky yellow
65	*Inocybe*	sp. tan gills, clean stem
53	*Inocybe*	sp. tan skirt
1632K	*Inocybe*	sp. tan with smooth pale stem
1856K	*Inocybe*	sp. tiny mustard
2053K	*Inocybe?*	sp. little brown
1753K	*Inonotus*	sp. chunky, rusty
558	*Isaria*	sp. white
1798K	*Labyrinthomyces*	sp. rusty tesselated skin
74	*Laccaria*	sp. pale
36	*Laccaria*	sp. pink
383	*Laccocephalum*	*tumulosum*
221	*Lactarius*	*clarkeae*
142	*Lactarius*	*eucalypti*
1832K	*Lactarius*	sp. bright orange cap
245	*Lactarius*	sp. white
478	*Laetiporus*	*portentosus*
1809K	*Lentinus*	sp. orange-brown cap
1568K	*Lepiota*	sp. aff. aspera
1910K	*Lepiota*	sp. brown cap
1916K	*Lepiota*	sp. brown ring
1706K	*Lepiota*	sp. greyish smooth scaly cap
235K	*Lepiota*	sp. minute fragile white
1911K	*Lepiota*	sp. pink
1986K	*Lepiota*	sp. red & yellow
1641K	*Lepiota*	sp. small dark brown
2043K	*Lepiota*	sp. small dk rust
1813K	*Lepiota*	sp. small white
1827K	*Lepiota*	sp. small white, droplets
1970K	*Lepiota*	sp. white, tiny brown fibrils
718K	*Lepista*	sp. peppery
1670K	*Leucoagaricus*	sp. burnt orange scaly cap
1623K	*Leucoagaricus*	sp. small brown capped
112	*Lichenomphalia*	*chromacea*
127	*Lichenomphalia*	*ericetorum*
1718K	*Limacella*	sp. cream white glutinous
2076K	*Lycoperdon*	sp. brown gleba
1763K	*Lycoperdon*	sp. dark brown
2063K	*Lycoperdon*	sp. khaki spored
1502K	*Lycoperdon*	*stellatum*

1465K	*Lyophyllum*	sp. grey capped
210K	*Lyophyllum*	sp. purple & grey
1857K	*Lyophyllum*	sp. small dull grey
1584K	*Lyophyllum*	sp. tiny grey brown
1271K	*Macowanites*	*luteiroseus*
190	*Macrolepiota*	*clelandii*
2001K	*Marasmiellus*	sp. cream and brown
1691K	*Marasmiellus*	sp. marginate gills
55	*Marasmius*	*crinusequi*
1166K	*Marasmius*	sp. large garlic
341	*Marasmius*	sp. orange
489	*Melanoleuca*	*melaleuca*
1640K	*Melanoleuca*	sp. grey gills
1708K	*Melanoleuca*	sp. short grey
919K	*Melanophyllum*	*haematospermum*
1925K	*Meruliopsis*	*corium*
1843K	*Micromphale*	sp. rusty brown cap
1504K	*Microporellus*	sp. soft
1467K	*Mycena*	*clarkeana*
437	*Mycena*	*kurramulla*
50	*Mycena*	*mijoii*
144	*Mycena*	*sanguinolenta*
372	*Mycena*	sp. ?fumosa
308	*Mycena*	sp. brown, no bleach
51	*Mycena*	sp. buff umbrella
1529K	*Mycena*	sp. minute brown
1528K	*Mycena*	sp. pink topped
571	*Mycena*	sp. pointy
491	*Mycena*	sp. round top cone
1818K	*Mycena*	sp. sm grey bleach
386	*Mycena*	sp. sticky white
870K	*Mycena*	sp. tall brown red marginate gills
1959K	*Mycena*	sp. tiny reddish, dry
64	*Mycena*	sp. tiny white
1812K	*Mycena*	sp. tiny white, yellow stem
191	*Mycena*	sp. white
285	*Mycena*	*subgalericulata*
66	*Mycena*	*vinacea*
238	*Mycena*	*yuulongicola*
413	*Nidularia*	*farcta*
441	*Nothocastoreum*	*cretaceum*
213	*Omphalotus*	*nidiformis*
1947K	*Panaeolus*	*campanulatus*
1766K	*Panaeolus*	sp. parabolic cap
104	*Panellus*	*ligulatus*
311	*Panus*	*fasciatus*
335K	*Perenniporia*	*ochroleuca*
1794K	*Perenniporia*	*oviforma*
1797K	*Peziza*	*repanda*
524	*Peziza*	sp. areolate surface
661	*Peziza*	sp. black cups
527	*Peziza*	sp. dark brown cups
501	*Peziza*	sp. flat black
442	*Peziza*	sp. hollow spheres
330	*Peziza*	*tenacella*
488	*Phaeocollybia*	*ratticauda*
1752K	*Phaeotrametes*	*decipiens*
1780K	*Phallus*	*hadriani*
1677K	*Phanerochaete*	sp. smooth creamy yellow skin

1559K	*Phellinus*	sp. aff. robustus
136	*Phellinus*	sp. hard felty rust brown
1601K	*Phellinus*	sp. woody bracket
70	*Phellodon*	sp. aff. niger
70a	*Phellodon*	sp. aff.niger
497	*Phellodon*	sp. brown
1685K	*Phlebiella*	*tulasnelloidea?*
4KS	*Phlebopus*	*marginatus*
119	*Pholiota*	*multicingulata*
1859K	*Phylloporus*	sp. cracked cap
363	*Piptoporus*	*australiensis*
791K	*Pisolithus*	*albus*
401	*Pisolithus*	*marmoratus*
2038K	*Pisolithus*	sp. dark round
285K	*Pisolithus*	sp. sand dune
192	*Plectania*	sp. black
139K	*Pleurotus*	*australis*
133	*Pluteus*	*atromarginatus*
47b	*Pluteus*	*lutescens*
659	*Pluteus*	*nanus*
248	*Pluteus*	sp. aff. cervinus
157	*Podoserpula*	*pusio*
1834K	*Pogiesperma*	sp. hard white
1844K	*Pogiesperma*	sp. white spheres
1627K	*Polyporus*	sp. leathery stalked, on wood
1620K	*Polyporus*	sp. thin pored bracket
145	*Poronia*	*erici*
1466K	*Porpoloma*	*griseum ms*
328K	*Protrubera*	*canescens*
250	*Psathyrella*	sp. fragile
1914K	*Psathyrella*	sp. small, with sticky cap
1531K	*Psathyrella*	sp. wrinkled cap
177	*Psilocybe*	*coprophila*
349	*Psilocybe*	*musci*
176	*Pycnoporus*	*coccineus*
52	*Ramaria*	*capitata var. capitata*
377	*Ramaria*	*lorithamnus*
102	*Ramaria*	*ochraceosalmonicolor*
1576K	*Ramaria*	sp. fragile white
1671K	*Ramaria*	sp. greenish yellow
1887K	*Ramaria*	sp. small violet
254	*Ramaria*	*versatilis*
827K	*Ramariopsis*	*depokensis*
1555K	*Ramariopsis*	sp. small orange coral
1554K	*Resupinatus*	*applicatus*
181	*Rhodocollybia*	sp. aff. butyracea
2071K	*Rhodocybe*	sp. pink spored
209	*Rickenella*	*fibula*
1823K	*Rosellinia*	sp. scattered black spheres
69	*Russula*	*adusta*
173K	*Russula*	*erumpens*
92	*Russula*	*neerimea*
178	*Russula*	*persanguinea*
552	*Russula*	sp. aff. albonigra
90	*Russula*	sp. aff. cyanoxantha
89	*Russula*	sp. clelandii group
1861K	*Russula*	sp. small orange-tinged+C593
10a	*Russula*	sp. small white
107	*Russula*	sp. grey cap

10	*Russula*	sp. large white
276	*Russula*	sp. pale pink
559	*Russula*	sp. peaches and cream
1523K	*Schizoporus*	sp. pored resupinate
1460K	*Scleroderma*	*cepa*
1509K	*Scleroderma*	*mayama*
315	*Scleroderma*	sp. bright yellow
1819K	*Scleroderma*	sp. yellow
150	*Scutellinia*	sp. scarlet
306	*Sphaerobolus*	*stellatus*
1538K	*Stephanospora*	sp. yellow
62	*Stereum*	*hirsutum*
149	*Stereum*	*illudens*
1776K	*Stereum*	sp. brown
67	*Stropharia*	*semiglobata*
575	*Stropharia*	sp. rust cap
1759K	*Stropharia*	sp. tiny orange tan
1800K	*Stropharia*	sp. tiny orange yellow
1782K	*Thaxterogaster*	sp. tan, glutinous
586	*Thelephora*	sp. brown fibrillose
1734K	*Thelephora*	sp. brown velvet
427	*Thelephora*	sp. coralloid
266	*Thelephora*	sp. orange margin
1463K	*Thelephora*	sp. white velvet
504	*Tomentella*	sp. yellow ochre skin
482	*Torrendia*	*arenaria*
87K	*Torrendia*	*arenaria*
2028K	*Torrendia*	*grandis*
1457K	*Torrendia*	*inculta*
2065K	*Torrendia*	sp. dried
1917K	*Trametes*	*velutina*
63	*Trametes*	*versicolor*
60	*Tremella*	*mesenterica*
287	*Tremella*	*candida var. globispora*
777K	*Trichoglossum*	*hirsutum*
1151K	*Trichoglossum*	sp. white
54	*Tricholoma*	*eucalypticum*
1703K	*Tricholoma*	sp. almost white
1893K	*Tricholoma*	sp. apricot glutinous
594	*Tricholoma*	sp. creamy brown gills
161	*Tricholoma*	sp. grey
411	*Tricholoma*	sp. pale
211	*Tricholoma*	sp. pale tan
1929K	*Tricholoma*	sp. pinkish brown
1536K	*Tricholoma*	sp. pinkish gills
446	*Tricholoma*	sp. ring
1931K	*Tricholoma*	sp. white & rust
662K	*Tricholomopsis*	*rutilans*
1488K	*Tubaria*	*furfuracea*
189	*Tubaria*	*rufofulva*
1704K	*Tulostoma*	sp. white
261	*Typhula*	sp. sm white
1519K	Unknown	sp. ascomycete
1692K	Unknown	sp. grey brown agaric
1656K	Unknown	sp. milky hypogeous
1658K	Unknown	sp. phalloid
1715K	Unknown	sp. Russula mould
1807K	Unknown	sp. small funnel-cap
1781K	Unknown	sp. white truffle

331	Unknown	sp. big orange discs
329	Unknown	sp. brown capped
1898K	Unknown	sp. brown cup fungi
1939K	Unknown	sp. brown gilled
1852K	Unknown	sp. brown pointy cap
1937K	Unknown	sp. corticioid white
1960K	Unknown	sp. Cortinoid truffle
2012K	Unknown	sp. excentric stem
567	Unknown	sp. fluffy salmon buttons
2057K	Unknown	sp. hard woody bracket
2068K	Unknown	sp. on Eucalyptus doratoxylon leaves
1873K	Unknown	sp. pale gill margin
1927K	Unknown	sp. slimy brown cap
1971K	Unknown	sp. small brown, decurrent gills
1890K	Unknown	sp. small cortinarius type
2024K	Unknown	sp. small greyish cream with nodulose spores
2078K	Unknown	sp. spots on Banksia attenuata leaves
2079K	Unknown	sp. spots on Hakea ferruginea leaves
388	Unknown	sp. thin stalked polypore
1909K	Unknown	sp. tiny white gilled, with stalk
1919K	Unknown	sp. truffle with smooth, elongated spores
116	Unknown	sp. white corticioid, droplets
1938K	Unknown	sp. white hypogeous
1982K	Unknown	sp. white solitary coral
277	Unknown	sp. white woody bracket
1900K	Unknown	sp. yellow discs
294	Unknown	sp. yellow discs on pigface
1936K	Unknown	sp. yellow discs on sheoak needles
510	Unknown	sp. yellow toothed corticiod
1795K	*Vararia or Dichostereum*	sp. pale yellow skin
152K	*Volvariella*	*speciosa*
2	*Xerula*	*australis*
1646K	*Xerula*	sp. radicata group
175	*Xylaria*	*hypoxylon*
1802K	*Xylaria*	sp. tiny pointed
428	*Xylaria*	*polymorpha*
1783K	*Zelleromyces*	sp. small dark burnt orange

Appendix 2: Sample page of micro drawings made using compound microscope & camera lucida

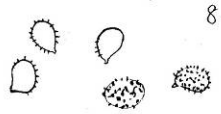
SURVEY OF FUNGI OF THE SOUTH COAST NRM REGION

KS 1544/06	Date:	Genus:	Russula
		Species:	
Digital Image Nos		Field Name	White

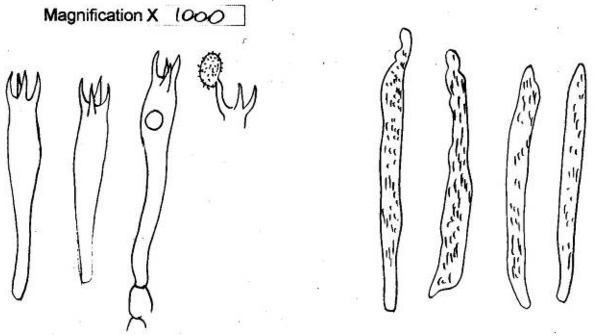
Notes: Lamellar trama spherical, inflated – entirely
No cheilocystidia found.
Pleurocystidia present, but inocuous

Melzers	✓
Amyloid	✓
Dextrinoid	
No reaction	
Water	
KOH 3%	✓
KOH 15%	
Congo red	✓
Methylene blue	

Spores Amyloid, warted
8-10.5 x 5-6.5 μm



Magnification X 1000



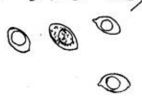
SURVEY OF FUNGI OF THE SOUTH COAST NRM REGION

KS 1592/06	Date:	Genus:	Inocybe
		Species:	
Digital Image Nos		Field Name	

Notes: Cheilocystidia napiform
No pleurocystidia
Lamellar trama encrusted (brown granules in 3% KOH), parallel
Basidia hyaline, some brown (?refractive); Clamps present

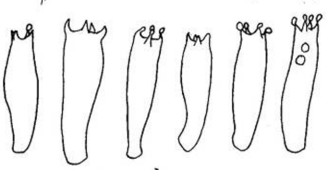
Melzers	
Amyloid	
Dextrinoid	
No reaction	
Water	
KOH 3%	✓
KOH 15%	
Congo red	✓
Methylene blue	

Spores brown, ornamented (warty), with large guttule
7–9 x 5–5.5 μm

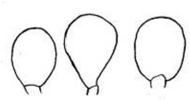


Magnification X 1000

Difficult to separate hyphae (incl. basidia & cystidia)



basidia



cheilocystidia

Appendix 3: Sample pages of fungi description, microscopy and photograph, for *Tricholoma* sp. 'pinkish gilled' 1536K

F U N G I   F I E L D   D A T A

Date: 23rd June 2006	**COLLECTION No:** KS1536/06
Field name: pinkish gilled	**Genus:** Tricholoma
Collector: *Katrina Syme*	**Species:**
Location: WA, West Cape Howe NP, Bibbulmun Track east of road	
GPS Lat: 35° 05' 56.9" S	**Long:** 117° 37' 54.8" E **Alt:**
Plant Assoc: Agonis/Taxandra, E. marginata/Acacia	
Habit: Gregarious	
No./age of f/b's examined: 2, both mature	
Spore Print: white	
Odour: none	**Taste:** –
KOH: –	
Other chemical tests: –	
Photos: 270, 271, 272	
Characterised by:	
1. Silky pink-tan Pileus	
2. Deep pinkish-tan lamellae	
3. Short stipe with pinkish pruina at apex	
4.	

Pileus:– 60-74 mm broad, circular, shallowly depressed, margin incurved narrowly, partially straight, surface dry, silky to shiny, smooth, appressed radially fibrillose/virgate, pinkish-tan 5A3 – 5B4

Flesh:– Hard, solid, thick, pale creamy tan up to 13 mm at centre

Lamellae:– 25-30 mm long x 6-14 mm deep, narrowly adnexed/sinuate, almost free, moderately broad, close, margin unevenly wavy (slightly) becoming rimose, creamy to pinkish tan with small rust spots developing 5A2-5A3, 5B4
Two tiers of lamellulae

Stipe:– 25-34 mm long x 8-14; 11-13 mm wide, tapering upwards from narrower base, central, terete, dry, dull, creamy white with apricot tan tiny squamules from above base to apex

Flesh:– hard, solid, pale cream

SURVEY OF FUNGI OF THE SOUTH COAST NRM REGION

KS 1536 **Date:** **Genus:** Tricholoma

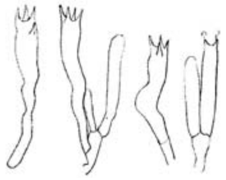
Species:

Digital Image Nos **Field Name**

Notes: No clamps
Lamellar trama hyaline, thin-walled, varying widths, narrowing at septae, pale yellow-tan in 3% KOH
No cystidia
Basidia hyaline, colourless

Melzers	✓	Spores hyaline, large guttule, smooth
Amyloid		5 – 5.6 × 4 – 5 µm
Dextrinoid		
No reaction	✓	
Water		
KOH 3%	✓	
KOH 15%		
Congo red	✓	
Methylene blue		

Magnification X 1000



Appendix 4: GPS locations in the South Coast NRM Region where fungi observations were made.