

Puzzles and Mysteries on the Forest & Ocean Floor

As we wander the through our peaceful and at times dense bushlands, few of us in the general public would pause to consider or know about a group of plants know as Cryptogams.

This edition of the newsletter highlights some of the work being carried out in the WA Herbarium on cryptogams. Many volunteers at the Herbarium are studying and assisting in the curation of these often overlooked and least understood of 'plants'.

Strictly applied, the word cryptogam refers to all plants that reproduce by spores rather than seeds, but usually excludes ferns which, while spore bearing, are included with the vascular plants (FloraBase 2005). Cryptogams have hidden reproductive organs hence the name 'crypto' – hidden or puzzling – and 'gam' – reproductive parts. The following groups considered to be cryptogams are a diverse set of unrelated organisms:



- Lichens
- Algae
- Fungi
- Bryophytes (mosses, liverworts and hornworts)
- Myxomycetes (slime moulds)



Marine Plant

Moss

Cryptogams play a major role in maintaining ecological health, and raising awareness and extending our knowledge of them is crucial.

Online Marine Plant Project

Providing on-line information on Western Australia's marine plants is a collaborative project involving CALM's Western Australian Herbarium and Marine Conservation Branch, with assistance in funding from CoastCare and the Natural Heritage Trust.

The project will provide on-line information on marine macro-algae and seagrass via CALM's information system, FloraBase. A database of 24 500 specimen records, comprising collections from the WA Herbarium, CSIRO, Murdoch University and University of WA will be supported by an authoritative census of WA's Marine Plants.

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Online Marine Plant Project Continued

The data will provide extensive support to agencies and researchers contributing to the conservation of WA's biodiversity. Scientists, community groups and volunteers will be able to access up-to-date authoritative names, descriptions, maps and images of marine plants, adding valuable information to local projects.

Project achievements to date:

- The Herbarium System administrator, Paul Gioia and database supervisor Sue Carroll are incorporating the Australian Marine Plant Name Index (AMANI) information into WACensus and the delivery system FloraBase.
- A phycologist, Dr John Huisman has been contracted to verify the identification of unnamed specimens.
- Melanie Baister and Evelyn McGough have the huge task of databasing the collection information, and calculating marine latitude and longitudes.
- John Dale has been managing the flow of boxes and incorporating specimens.

A number of volunteers at the Herbarium are involved in this project and we gratefully acknowledge their assistance. Kate Knight, Bruce Robinson and Yvonne Hutton, Fran Kininmonth and Denise French are expertly scrutinising 1000s of specimens from CSIRO and UWA to mount, repair or attach annotation slips etc before databasing. All these tasks are essential in helping produce and maintain a reliable, up-to-date source of information on all WA marine plant taxa.



Brimming with Enthusiasm - Volunteer Profile

Margaret Brims

You all know one good turn deserves another? About six years ago, I was collecting mosses at Jandakot for another volunteer, when I came across some beautiful, rich green moss on a small branch. And there, in the centre, was a tiny bright red dot.

Of course, I brought the moss to the Herbarium and set about asking all and sundry- "What is the red dot?" I am forever grateful to Ray Cranfield, for "having a go" and suggesting it was a slime mould. *Slime mould*?

Now, go back to 1978, a Dutch mycologist (Jasper Daams) visited Western Australia and whilst collecting fungi, he also collected about thirty slime moulds. Also around this time, the library acquired two books on Myxomycetes (the botanical name for "slime moulds").



Volunteer Margaret Brims checking out slime mouldsjust the thing for those who like to get down and dirty

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Chang Sha Fang, the then collections manager, suggested that I look at Daam's collections and with the aid of the two reference books "see what I could make of it." Who could resist an invitation like that? Working on something which was hardly known in Australia. So began my "obsession" with slime moulds.

It provided my husband and I with the impetus to go to Belgium for a worldwide conference on the systematics and ecology of Myxomycetes in 2002. There we met Dr Steve L. Stephenson, from Arkansas, who is a world expert in slime moulds and who also had just been given an Australian Botanical Resource Study grant, to produce a book on Australian slime moulds.

We organised and accompanied him on a collecting trip around the South West of Western Australia in 2003, and again in 2004, on another collecting trip in Victoria and New South Wales.

So here I am- surrounded by dozens of boxes of myxos, many of which have been brought in by interested volunteers and staff members. We are all helping to put Australia on the future world Myxomycetes map.

And to think, this has all come about through lending a helping hand by collecting mosses for another volunteer.

Weaving Fungi Facts – Volunteer Profile

John Weaver

John left school at 13 years. After a variety of occupations he went back to completing his education as a mature-age student, with a Batchelor of Commerce, in the late 1970's.



Neale Bougher with John Weaver: Volunteer Database Manager for Perth Urban Bushland Fungi Project

A career as a lecturer with the Faculty of Economics & Commerce (UWA) followed. This spanned 12 years, during which time John was the first person, through his intense interest in the application of computers, to use them as teaching tools for students.

Later he moved into the Public Service as Manager, Human Resources for Transperth. Following the privatisation of the department, John was "headhunted" by TAFE, taking up another HR position with West Coast TAFE College. Health & Safety work at FESA followed. (A lot of us would be more familiar with this as the former WA Fire Brigades!)

On retiring John was looking around for something useful to do: a different kind of challenge! He'd been interested in identifying the fungi that occurred on a block of land he and his wife, Paddy, have between Albany and Denmark. He was "nagged" (quote, her word!) to do

something definite about this. Consequently they attended a 5 days, International Fungimap Conference, held in Denmark, WA. (June 2001.)

This experience provided the impetus for the next step. John contacted Neville Marchant, a long-time friend at WA Herbarium, offering his services. After a short time of trying to find his "special niche", John became aware of the Perth Urban Bushland Fungi (PUBF) project. Here his experience, ideas, skills and enthusiasm have been put to excellent use, through the development of a colourful and imaginative database and website for the project. This can be viewed at www.fungiperth.org.au.

John continues to work with the PUBF project, a few days a week. "It's providing a worthwhile and enjoyable experience and I am working with enthusiastic and capable leaders to show the importance of the fungi kingdom within the whole environment."

@your library

Highlights from Recent Acquisitions

Since the launch of the Perth Urban Bushland Fungi Project in conjunction with the WA Herbarium there has been a tremendous increase in the number of items the library has received on fungi. The following are from our recent acquisitions.

Moore, David

Slayers, saviors, servants and sex New York: Springer, 2001



Chapter titles like "Toxins: kill the primates, rule the world; Decay and degradation; Let's party; Birds do it, bees do it, even educated fleas do it" are rather intriguing – read on and in this expose of the kingdom Fungi you will learn how fungi "have killed us, saved us and served us since before written records began". The book looks at the impact fungi have on civilization and ecosystems. The Irish famine of 1845-46 caused by the failure of the potato crop because of a fungal plant disease not only caused widespread famine and deaths but led to mass emigration of the Irish population.

On the positive side the author shows us how fungi have benefited humankind – the development of penicillin and other antibiotics, fungi as food, mycorrhizal relationships with other plants and the role of wood- rotting fungi to name a few.

And did you know that the traditional advice for treating mushroom poisoning is "take the stomach of three rabbits and the brains of seven, chop them up finely, and give them (raw) to the patient mixed with sugar or jam"! Did it work?

Stamets, Paul

Growing gourmet and medicinal mushrooms. – 3rd ed. Berkeley: Ten Speed Press, 2000

After all those forays into the bush to look at mushrooms perhaps it's time to grow your own? This very detailed guide shows you how. Production techniques for both home and commercial growers, precise growth parameters for 31 species (the common champignon or button mushroom, shiitake mushroom, wood ear and other more exotic species), gardening tips and a troubleshooting guide are included. And when you have harvested your first crop you can try out the recipes given in the last chapter.



Eldridge, David, Tozer, Merrin E.; photography Lepp, Heino

A practical guide to soil lichens and bryophytes of Australia's dry country Sydney: Dept. of Land and Water Conservation, 1997

Although not a recent publication this book still serves a useful purpose in bringing together a decade of research into soil crusts and how they are affected by land management practices. Most of the book is devoted to the description and identification of mosses and lichens in the soil surface. Most species are illustrated by colour photographs.

@your library continued page 5

@your library continued

If you are interested in learning more on Marine Plants;

Huisman, John

Marine plants of Australia Nedlands, W.A.: UWA Press, 2000



An invaluable identification guide for anyone interested in Australia's underwater plant life. Over 300 species are illustrated by colour underwater photographs in this naturalists' guide. The photographs illustrate the amazing range of shapes, colours and patterns. To introduce marine plants to a wider audience the author has avoided inclusion of closely related plants not easily distinguishable in the field. Readers wanting more detail are directed to further references.

Dr Huisman, an algal taxonomist based at Murdoch University, is currently assisting the Herbarium in the curation of its algal collection.

Perth Urban Bushland Project

Perth Urban Bushland Fungi (PUBF) is a collaborative project begun in 2004 between the Urban Bushland Council and the Western Australian Naturalists' Club in conjunction with the Department of Conservation and Land Management (CALM), Western Australian Herbarium and with financial support from Lotterywest.

Over the past 10 years, many well attended fungi forays and workshops have been held in urban bushlands of Perth Western Australia. These events have highlighted growing requests by community and professional land managers to address the low level of awareness about fungi and their general exclusion from bushland management.



Presently at the Herbarium we have a specialist group of volunteers working on the PUBF project coordinated by Dr Neale Bougher (Mycologist) and Roz Hart (Community Education Officer).

Further information on the PUBF project is available at www.fungiperth.org.au

Western Australian Lichen Flora

Ray Cranfield

Lichens are an important component of our floral biota, in that they are digesters releasing nutrients and supplying food for other higher groups of flora and fauna. Lichens are a mutual benefit society of principally fungi partnered with either green algae or cyanobacteria. Several lichen families and species are represented in fungal collections and these are known as lichenised fungi.

Lichens are diverse flora and occur on almost any stable substrate, in some very extreme climatic conditions as well as conditions that are perceived as ideal. They can be divided into several broad classifications that are a reflection of their life forms. Principally there are 3-4 primary common groups, which are foliose, crustose, fruticose and filamentous, but there are others that may look similar or are not represented by a large number of species.

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These primary superficial groupings are handy when sorting specimens but in some instances may provide false or confused family classifications. Lichens are identified in several ways which include the traditional classifications that involve the use of major observable characters, but in many instances to derive a species requires the use of chemical reactions or analysis using analytical instruments.

A census of Western Australian lichens has been prepared and published in *Nuytsia*. The Western Australian Herbarium is developing the provision of an on-line census as part of Florabase. It is envisaged that images will also be available to assist in recognising these difficult members of our flora. Although not a large component of our flora (580 species), new taxa are regularly being found and described. The distribution of known species is being regularly extended as field surveys add to our collection and knowledge. Many of our species have worldwide distribution but there are many that are endemic to Australia and several that occur only in Western Australia.

The collection and recording of ecological data has become an integral part of several CALM projects. It is envisaged that long term monitoring of this flora will help to develop a better understanding of our landscapes and their management. All material associated with these projects has been placed in the Herbarium where access to possible unknown species can be reviewed by visiting experts studying specific taxa.

Moss People I Know...

Louise Biggs

I became interested in Bryophytes by accident. My plant biology lecturer asked if I would like to do Honours with her and I reluctantly agreed, having no idea on what I would base the study. She starting hinting about Bryophytes, more specifically the reproduction of bryophytes and after much persuasion, I said yes. Once I started my project on the sexual reproduction of the moss, *Atrichum androgynum*, I was instantly hooked on Bryophytes.

A challenging aspect of studying Bryophytes is trying to explain to people what I do. Most people have no idea what Bryophytes are so I tell them I look at moss. Unfortunately they think I have said moths and are very excited until I correct them.



Louise Biggs A rolling stone gathers no moths

My PhD is focused on the ecology of Bryophytes; mosses, hornworts and liverworts, at the Urban Bushland, Bold Park. This came about when it became apparent that there was little information of Western Australian Bryophytes, including those held at the Western Australian Herbarium.

In 1993 a census of Western Australian mosses was published, however it is not recognised by the WA Herbarium on the electronic census FloraBase and there is also no census of hornworts or liverworts since FloraBase currently covers only vascular plants. This part of my PhD aims to provide an up to date census for brophytes in the Perth region and to make the information of specimens already held at the WA Herbarium available electronically through the FloraBase web interface.

In the herbarium collections all specimens of liverworts, hornworts and mosses, from Gingin to Boyanup have their identity checked by me. Any inaccuracies with names or name changes are updated, based on the 2003 Catalogue of Australian Liverworts and Hornworts and the 2002 Catalogue of Australian Mosses.

At this point herbarium volunteer, Chris Hollister, becomes involved in the project. Chris locates the collections that are related to the specimens I have updated, checking the accuracy of the label details. Chris also applies the new name slip to each collection and manually updates the names on each packet. The specimens are passed to the databasing team, to edit all the changes, ensuring the database is up to date with the specimen details.

Neville's Notes

Herbarium Update

Planning is well under way for stage one of CALM's proposed Biodiversity Science Centre. The Herbarium will occupy most of the first stage. The other components will be the Flora Conservation Program, the Threatened Flora Seed Centre, the Science Directorate, all three Science Libraries, as well as CALM staff facilities.



The specimen vaults are being designed to hold about 1.3 million specimens that will give adequate room for our expected expansion. You can gain a general idea from the diagrams in the seminar room that show a long rectangular building, which may not be the final configuration. The diagrams are based on our preferred structure, to have a two-level herbarium with a long specimen vault that will be divided into sections and two parallel zones of functional areas. The zone parallel and adjacent to the vaults is suggested to be open plan curatorial and research areas. The third zone along the wall opposite the vaults is suggested as offices and closed work areas. Planning in earnest will begin sometime early next year and we hope that construction will commence in 2006 with a 12-18 month construction period.

Fascinations with Fungi

The winter fungi growing season is over and so too is the first stage of the very successful Perth Urban Bushland Council's (UBC) Bushland Fungi Project. The project was developed by the UBC in collaboration with other players and the Herbarium made a bid to house the project here, close to the herbarium collection of fungi and to benefit from our well-trained and eager volunteers who have an interest in the kingdom. The Project has surpassed all of its aims and has stimulated a great deal of public interest in WA fungi.



The herbarium PERTH is very keen to support any effort to capture information on WA's fungi and Neale Bougher has made a significant contribution to our taxonomic knowledge during the Project.

Roz Hart as Education Officer of the project arranged a number of excellent workshops and forays. A number of volunteer leaders assisted Roz and John Weaver, who brought creative IT skills to document fungi collections.

The CSIRO fungi collection has been transferred to PERTH so that we now have over 20000 specimens. The fungi herbarium provides an ideal starting point to expand our taxonomic program into these organisms that we believe play such a pivotal role in ecosystem health and management. Our major initial task will be to compile a census of WA fungi so that we can gather information about each species, in the same way as is being done for the vascular flora.

John Weaver, a volunteer, has developed a very descriptive web site that delivers large amounts of information on the project and on Perth's fungi.

We wish Neale and Roz well in their future endeavours and hope that they will continue to contribute to our knowledge base.

Volunteer Talk Review

Michelle Humphreys

On Friday August 19th Luke Bentley who works in the Nature Protection Branch of CALM made a presentation on his role as a Wildlife Officer.

Luke explained that the role of a Wildlife Officer is very diverse, with duties ranging from talking to the public about swooping magpies to managing marine mammal entanglements and strandings.

It was interesting to note that there are only 15 Wildlife Officers to manage the whole area of Western Australia.

Wildlife Officers protect both the flora and fauna of the state. As well as protecting all native animals they have to be on the lookout for people illegally picking wildflowers, brush cutting and felling trees for firewood.

These officers also watch for people involved in the illegal trade of Wildlife trafficking. We were fortunate to meet the aptly named "Lucky" the shingleback lizard, who had travelled twice illegally to Germany in a postpak bag. When the package was returned to Australia for the second time, Australia Post opened the postpak bag to find poor Lucky, by then very emaciated and with her legs taped to her body. Thankfully she survived and is now used by the department for education purposes.

Luke also asked that if the public see anything suspicious, for example: people who might be taking plants or animals from the wild, to call CALM or ring the Wildcare helpline on 9474 9055.



Val Preston, Evelyn McGough and Michelle Humphreys "feeling Lucky"

Herbarium Volunteer Talks

7 October 2005 Una Bell- Native Plants

4 November 2005 Chris Dunn, Kings Park– Phytophora

> 9 December 2005 Volunteer Christmas Lunch

Talks are held in the Reference Herbarium Start: 11:00am Morning Tea: 10:30am

Wildflower Press would like to thank all that contributed to the Winter Issue of the WA Herbarium Volunteer Newsletter. If you would like to contribute to future issues please contact Fran Kininmonth or Gaynor Stanicic at the Herbarium or Email to frankininmonth2004@yahoo.com.au or gaynors@calm.wa.gov.au