

Dear AMS Community,

Happy fungi season to those of you living where the rains have just begun. Your AMS Council has been busy this year so far, planning lots of exciting opportunities in mycology in Australasia. In November this year, the AMS will be partnering with NZMS to have a conference in real life – please stay tuned for further information in the coming months. The AMS are also continuing with our Virtual Seminars in 2022, and we will be bringing you news about new discoveries and cool fungi spotted across the year. We also have a little surprise for all members coming out soon – keep your eyes out for something in the mail! Make sure your membership is up-to-date so you can continue to take advantage of all these opportunities in 2022. We look forward to continuing ever forward with all of you this year!

Warm regards,

Anna Hopkins

Australasian Mycological Society Councillor

Website: <https://www.australasianmycologicalsociety.com/>

Facebook: [AMSstudents](#) and Twitter: [@ausmysoc](#)

## Research Grants

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### Australasian Mycological Society Research Grant

After a bit of a COVID-induced hiatus, AMS is proud to be able to re-launch our grant program for 2022!

Applications for the 2022 AMS research awards close on 27<sup>th</sup> April! Applications are welcomed from all current financial members of the AMS, especially junior members. The project must be carried out within Australasia and the applicant must be associated with an Australasian research organisation (citizen scientists can apply for the FungiMap Citizen Science Grant – see below). Successful applicants are asked to present the outcomes of their research at the AMS conference immediately following their award.

Up to two grants will be awarded in 2022, each with a maximum value of \$3000. One of the two grants will be prioritised for applicants who are junior members (Higher Degree Research students or recent PhD graduates). The second grant will be open to any member, regardless of career stage. For more details please check the AMS website.

## Membership

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Don't forget to renew your membership for 2022!

Join here: <https://www.australasianmycologicalsociety.com/membership>

If you joined before the end of March we will shortly be sending our your exclusive membership badges. If you need to update your mailing address, please write to Jordan

Bailey our treasurer: [ausmysoc.treasurer@gmail.com](mailto:ausmysoc.treasurer@gmail.com)

## AMS Virtual Seminar Series 2022

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Our seminars occur generally on the last Wednesday of the month at 12:00pm Sydney time. Talks are 30 minutes long and are followed by 15 minutes of questions from the audience. Please write to Tracey ([ausmysoc.president@gmail.com](mailto:ausmysoc.president@gmail.com)) if you're interested in presenting.

Members will soon be receiving a link to the seminar recordings. We apologise that this has taken longer than planned, but we hope to get at least the 2021 seminars to you in the next few weeks.

This month's seminar was on **Tuesday April 26<sup>th</sup>**. We had the pleasure of hosting **Dr Alistair McTaggart** from the Queensland Alliance for Agriculture and Food Innovation, University of Queensland, for his talk **"Sex and Drugs"**

**Summary:** Psilocybin is a psychoactive compound produced by over 200 species of Fungi (magic mushrooms), and has clinical potential to treat anxiety, depression and addiction. Psilocybin is a controlled substance and the biodiversity, taxonomy and distribution of magic mushrooms is poorly understood. Alistair hopes to (i) establish a living biological collection with the first permit granted in Australia to study magic mushrooms, (ii) resolve the taxonomy of *Psilocybe subaeruginosa*, and (iii) test hypotheses that *P. subaeruginosa* is native and *P. cubensis* is introduced to Australia. The project will provide a suite of biological, taxonomic, genomic, and chemical resources for future researchers. The project has potential impact for the international use and biopiracy of putative Australian species of psychoactive mushroom, the importation of living biological resources to produce psilocybin, and ongoing research into potential uses of psilocybin for human health and animal welfare. Check out Alistair's research blog for updates here: <https://alistairmctaggart.weebly.com/magicmushrooms>.



Our next seminar is on **Wednesday May 25, 12:00 PM AEST (2pm NZ time)**

**Kar-Chun Tan (KC)** The Centre for Crop Disease Management, Curtin University

**"Untangling the 'Gordian knot' – How to unravel a complex fungal disease of wheat by understanding its game of effector hide-and-seek"**

**Summary:** Breeding for durable resistance to fungal diseases in crops is a continual challenge for crop breeders. Association studies on mapping populations infected by isolate mixtures are often used by researchers to seek out novel sources of genetic resistance. Often, disease resistance quantitative trait loci (QTL) detected are often minor and inconsistent. This is a problem with septoria nodorum blotch (SNB) of wheat caused by *Parastagonospora nodorum*. The fungus uses a suite of necrotrophic effectors (NEs) to cause SNB. Interactions between these NEs are complex during infection, where they masked each other's contribution to SNB through epistasis and impedes progress in breeding for SNB resistance in wheat. We characterised a genetic element, called PE401, in the promoter of the major NE gene Tox1. PE401 functions as a transcriptional repressor of Tox1 and exerts epistatic control on another major SNB resistance QTL in the host. Implications of this finding in crop protection will be discussed.



## Shifting soil fungal communities in response to fire and weed management in urban Banksia woodlands

Aaron Brace

PhD Student, Molecular Ecology and Evolution Group, Edith Cowan University, Joondalup WA



The Banksia woodland surrounding the city of Perth on Western Australia's Swan Coastal Plain is iconic. The woodland is host to a diverse community of plants and animals, with some of the flowers, insects and birds being a delight to observe. Due to the ever-expanding urban landscape, the woodland is endangered and in 2016, was listed as a Threatened Ecological Community. Important threats to the woodlands include invasive weed species such as *Erhata calycina*, fire and climate change impacts such as drought. Much research has investigated the impact of these threats on the above ground aspects of the Banksia woodland but what if there was an important element that needs to be investigated from 'the ground up'?

My PhD project investigates the soil fungi found in the Banksia woodland and how it is affected by fire and invasive species management (prescribed burns and herbicide application). I have used molecular methods (high throughput sequencing) and found around 14,000 molecular fungal taxa across the range of the woodland. When comparing areas with different fire regimes, I found that the soil fungi in the Banksia woodland seems to be fairly resilient to the effects of fire, with the community recovering fairly quickly to pre-fire levels. I have also found that using herbicides significantly changes soil fungal community, much more than any impact of fire. I am in the final year of my PhD, so please keep an eye out for me at future conferences and in publications very soon!



Dense Banksia woodland in Yea Nature reserve. Photo: Aaron Brace

Aaron's project is supported by the Department of Biodiversity Conservation and Attractions where it is supervised by Dr Katinka Ruthrof, Dr Ben Miller as well as Dr Joe Fontaine (Murdoch University) and Dr Anna Hopkins (Edith Cowan University).

For more information about research in Banksia woodlands, please see:

Ritchie AL, et al (2021). A threatened ecological community: research advances and priorities for Banksia woodlands. *Australian Journal of Botany*. 69: 53-84 DOI: 10.1071/BT20089

### How a little marsupial's poo nurtures urban gardens and bushland (and how you can help protect them)

Anna Hopkins<sup>1</sup> and Natasha Tay<sup>2</sup>

<sup>1</sup>Molecular Ecology and Evolution Group, Conservation and Biodiversity Research Centre, Edith Cowan University, Joondalup, WA, Australia

<sup>2</sup>Terrestrial Ecosystem Science and Sustainability, Harry Butler Institute, Murdoch University, Murdoch, WA, Australia.

Wildlife encounters can be few and far between in cities but, if you're lucky, you might catch sight of a small Aussie marsupial in Perth that's helping keep urban bushland healthy. Quenda, a rabbit-sized digging mammal native to southwestern Australia, are found in patches of bushland, parkland and even backyard gardens. And our latest research shows just how important these unassuming marsupials are to Australian ecosystems.



A quenda. Photo: Narelle Dybing

We found quenda eat a huge variety of specialised fungi called mycorrhizal fungi, which play a key role in helping native vegetation, including eucalyptus trees, absorb water and nutrients. The fungal spores survive in quenda droppings, which can then colonise eucalypt roots. In fact, we found one little scat with over 100 types of fungi in it – that's some very efficient fungal dispersal! Quenda are considered rare or near threatened due to habitat clearing and predation by introduced predators – cats, dogs and foxes. It's crucial we manage and maintain their population in and around cities to ensure they have a positive influence on urban ecosystems.

#### Nature's gardeners

Many different Australian mammals dig in the soil for food or shelter, including bettongs, potoroos, bandicoots and echidnas. Sadly, most of Australia's digging mammals are threatened with extinction, and many now have very restricted distributions as their habitat is cleared for urban development and they are preyed on by cats and foxes. Once thought to be a subspecies of the southern brown bandicoot, the quenda was recognised as its own distinct species (*Isoodon fusciventer*) in 2018 and is found only in the southwestern corner of Australia.

Quenda are prolific diggers in their search for dinner – a single quenda can dig up to 45 small pits per night. Although each pit is small, one quenda can dig over four tonnes of soil each year in total, almost 30 wheelbarrow loads. Quenda and other digging mammals are like nature's gardeners. Their digging helps break the water repellent layer on the soil surface, allowing more water to infiltrate the soil, and decreases soil compaction and erosion. Quenda digs also incorporate leaf litter and seeds into the soil, and this improves conditions for native plants to grow and thrive.



Quenda can dig up to 45 pits per night. Photo: Natasha Tay

### 45 species in each scat

But perhaps the biggest way they help Australian ecosystems is by dispersing fungal spores in their droppings. We examined quenda scats from urban bushland south of Perth, and found they contained a large variety of fungi. Quenda scats are only 3-5cm long, but had an average of 45 different fungal species in each that the quenda would have deliberately sought out and eaten. These include fungi that produce underground truffle-like fruitbodies, much like the famous black truffles we eat. Because the truffle-like fruitbodies are found underground, they cannot easily disperse their spores. This means they rely almost entirely on quenda and other animals to dig them up and disperse the spores in their poo.



*Mesophellia* are a genus of truffle-like fungi often eaten by mycophagous mammals  
Photo: Bill Dunstan

This is a wonderful example of a mutually beneficial – or symbiotic – relationship: the quenda gets a delicious meal and the fungus has their spores dispersed far and wide. We found more than half of the fungi species in quenda scats are mycorrhizal. These fungi form a mutually beneficial relationship with the roots of over 90% of the world's plants including most native Australian species. In this mycorrhizal relationship, the plant gives the fungus carbohydrates – a product of photosynthesis. In return, the fungus takes nutrients and water from the soil and passes them to the plant.

The mycorrhizal fungi are essential to healthy forests and bushland. When plants such as eucalypts team up with mycorrhizal fungi, the plants grow taller and faster and are better protected from stresses such as drought and pathogens. Given very few other species of digging mammals survive in urban bushland, it's clear quenda play a vital role to disperse mycorrhizal fungi.

This is an excerpt from an article that first appeared in *The Conversation* on January 24<sup>th</sup> 2022.

This work has also been published as:

Hopkins, AJM, Tay, NE, Bryant, G, Ruthrof, KX, Valentine, LE, Kobryn, H, Burgess, TI, Beal Richardson, B, Hardy, GESTJ and Fleming, PA. (2021). Urban remnant size alters fungal functional groups dispersed by a digging mammal. *Biodiversity and Conservation* 30: 3983–4003. DOI: 10.1007/s10531-021-02287-4.

## Citizen Science

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### Australian fungi, slime moulds and the people who find them

Adrian Power

I'm a budding citizen scientist who recently became interested in fungi, protozoa and especially the data captured on iNaturalist. Through exploring the data, I discovered that one person can make a world of difference to the information available about fungi and protozoa in Australia. I've put together this document, "Australian fungi, slime moulds and the people who find them", which brings together some interesting summary statistics and insights I have found from the iNaturalist data. It can be downloaded here: [https://adrianpower.com/AFSM\\_VOL\\_1.pdf](https://adrianpower.com/AFSM_VOL_1.pdf)



I have focused on the people as well as the biology. The insights highlight the value and potential of citizen science to contribute to an evidence base to help understand a subject that is literally and figuratively 'in the dark'.

My favourite insight, as of March 2022, is that the top 50 observers of fungi on iNaturalist represent only 0.5% of all users, yet their observations contribute almost half (47.25%) of the total observations. It is also fascinating to see how observations can help track the spread of Orange Pore Fungus. These examples demonstrate the value of citizen science and how one person can make an impact. I hope my document inspires others to contribute to

iNaturalist so that information collected can inform science about fungi and protozoa in Australia.

## Upcoming Mycology Events – Announcements and Changes

### 2022 New Zealand Microbiological Society Annual Conference



With details almost ironed out, the New Zealand Microbiological Society will be holding their annual conference in Wellington New Zealand, in the last week of November.

AMS will soon be announcing details about our annual conference, which we're pleased to say, will be a collaboration with NZMS. More info soon!



### Fungal Network of New Zealand (FUNNZ): 2022 Fungal Foray

[Website](#)

The 2022 fungal foray will be held at the Dutch Hall in Rotorua from 16<sup>th</sup> - 20<sup>th</sup> May, with the colloquium day being at Scion.

### Australian Biosecurity Symposium



**New Dates: 3-5 May 2022** | [Website](#) | Gold Coast, Queensland

Animal Health Australia, the Invasive Species Council, the Centre for Invasive Species Solutions and Plant Health Australia are excited to host the 2021 Australian Biosecurity Symposium. This will once again focus on biosecurity prevention and provide the opportunity to share research and innovation, explore outside-of-the-box thinking and exchange knowledge and ideas across the biosecurity collective – agriculture (animals and plants), pest animals, weeds, wildlife, aquatics, humans, and the environment. This year's theme is 'a decade of biosecurity: turning a

moment into a movement.'

## SES 2022 Biennial Meeting of the Soil Ecology Society



*Organisers:* Soil Ecology Society, Pacific Northwest National Laboratory  
May 17-19, 2022 | [Website](#) | Richmond, Washington USA

Join the Soil Ecology Society Biennial Meeting occurring Tuesday-Thursday, May 17-19, 2022. This action-packed event will feature keynote speakers, panel discussions, field trip opportunities, flash talks, poster sessions, laboratory tours, awards, and networking opportunities. The Biennial Meeting is planned as a hybrid event with participation possible both in-person at Pacific Northwest National Laboratory in Richland, Washington and via Zoom. If travel and meeting policies will not allow for an in-person meeting, a decision to shift to an entirely virtual event will be made mid-March. More information will be forthcoming regarding registration and whether there will be a registration fee.

## International Conference on Mycorrhiza (ICOM 11)



July 31-August 5, 2022 | [Website](#) | Beijing, China

ICOM 11, will cover a broad range of research topics in mycorrhizal research including: taxonomy, diversity, ecology, molecular biology, genomics and transcriptomic, restoration and applied technologies for mycorrhizae. Given the changing global instructions with regards to travel, this conference is likely to be a hybrid online/in-person event. Check website for updates.

## Asian Mycology Congress AMC2021



August 3-5 2022 | [Website](#) | Pathum Thani, Thailand & Online

It has been more than a decade since the AMC was held in Thailand and we are delighted to host this conference in Pathum Thani. The theme of the congress is Asian Mycology in the 21st century: the new generation, and we will focus on the young generation of mycologists who will be at the forefront of Mycology in the future. The congress will cover a wide range of topics from basic science (taxonomy, ecology, pathology) to the applied aspects (biological control, biotechnology, genomics, metabolomics).

## 22<sup>nd</sup> World Congress of Soil Science 2022



*Organisers:* International Society for Microbial Ecology  
31 July – 5 August, 2022 | [Website](#) | Glasgow, UK

At a time of global concern for our planet and its growing population, managing our soils sustainably has never been as important. 90% of our food comes from soil, as does all of our timber and other fibre. Soil, and the ecosystems it supports, have a huge role in mitigating against climate change, is a vast reservoir of biodiversity, plays a significant role in flood management and contains key evidence of past civilisations. Our understanding of the importance of these functions is developing rapidly and the Congress provides the ideal setting to discover the international state of the art in these critical global issues and an opportunity to connect across all who work with and rely on soils.

## 18<sup>th</sup> International Symposium on Microbial Ecology



14-19 August, 2022 | [Website](#) | Lausanne, Switzerland  
ISME18 is the 18th edition of our non-profit symposium which takes place every two years. The conference is the front runner in the field of microbial ecology, with an average of around 1,750 international scientists that attend the conference.

**The 2022 Joint Conference of the Ecological Society of Australia and the Society for Conservation Biology Oceania** 28 November – 2 December | [Visit Website](#) | Wollongong, NSW

**ESA-SCBO 2022**

28 November – 2 December 2022 | Wollongong NSW

ESA-SCBO 2022 will be an in-person conference, but a limited number of online options will be offered, including live-streamed plenaries, some live-streamed symposia and some of the presentations being made available online after the conference.

The 2022 Conference theme is 'Reconnecting'.

As the world begins to open again, many of us are embracing the opportunity to reconnect – with each other, with nature, and with efforts to restore connections within nature.

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If you have anything you'd like to contribute to the next edition, or if you would like to have your research or event featured, please contact our Secretary Johanna Wong ([ausmycosoc@gmail.com](mailto:ausmycosoc@gmail.com)) or President Tracey Steinrucken ([ausmysoc.president@gmail.com](mailto:ausmysoc.president@gmail.com)). We're after content highlighting your latest research, profiles on mycologists from your network, mycological events and news, career and scholarship opportunities, and photos of new or interesting fungal species.

We hope you enjoyed the April 2022 edition of the AMS Newsletter. Thank-you for your continued support of our society.

Stay safe and all the best  
**Anna Hopkins**, AMS Councilor