



22<sup>nd</sup> January 2021

Dear AMS Member,

Happy new year to all of our members! I hope that you had a safe and relaxing holiday season. As a transplant from the Northern Hemisphere, I must admit to missing the ability to cosy up to a roaring fireplace with a mug of tea at this time of year and watch the snow fall outside, but there is also huge enjoyment in getting to spend time in the garden, experiment with new ice teas, and soak up the sunshine across the Christmas and January holidays. As we all return to work and our research, we at the AMS have been working to put together a newsletter highlighting recent research and some cool highlights for your reading pleasure. Also, we will be kicking off our seminar series with a phenomenal line-up of engaging researchers, so do make the time to come to those. For upcoming newsletters, I would like to remind you that if you have research or news to share, mycological events to promote, or if you've taken a great photo of a fungus, please get in touch with our secretary Laszló Irinyi: [geza25@gmail.com](mailto:geza25@gmail.com).

Stay safe,

Dr Jonathan Plett

Australasian Mycological Society Councillor on behalf of the Council

Website: <https://www.australasianmycologysociety.com/>; Facebook: [AMSstudents](#) and Twitter: [@ausmycsoc](#)

## News from the AMS Council

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### AMS VIRTUAL SEMINAR SERIES



We are happy to announce that starting this month, we will be holding a monthly seminar on the last Wednesday of each month at 12:00pm AEDT. Talks are 30 minutes long and are followed by 15 minutes of questions from the audience. This month, we will be hearing from Dr. Stephanie Watts-Fawkes (DPI-NSW) about her work on "*Identifying and characterising a zinc transporter involved in the arbuscular mycorrhizal symbiosis.*" To see upcoming seminar's, and to register your attendance, please book your spot on EventBrite (<https://www.eventbrite.com.au/e/australian-mycological-society-virtual-seminar-series-tickets-127088698719>) and we will send you the details of the seminar and a Zoom link prior to the date. Seminars will be recorded and available for registered attendees to view. This regular event will be hosted on Zoom and is **free for January**. From February onwards, however, these seminars will be only for AMS or International Mycological Association (IMA) members.

### MEMBERSHIP RENEWAL

It's that time of year! We would like to remind everyone that annual membership fees are now due. To make it easy, you can re-join directly on the website <https://www.australasianmycologysociety.com/> and click on 'Membership' under 'The Society' tab on the main page. Unsure if your membership is due? Drop Adam Frew an email at the treasurer email ([ausmycsoc.treasurer@gmail.com](mailto:ausmycsoc.treasurer@gmail.com))



## Feature Research:

### *Hyperparasites of rust fungi: Preventing plant disease and discovery of novel antifungal agents*

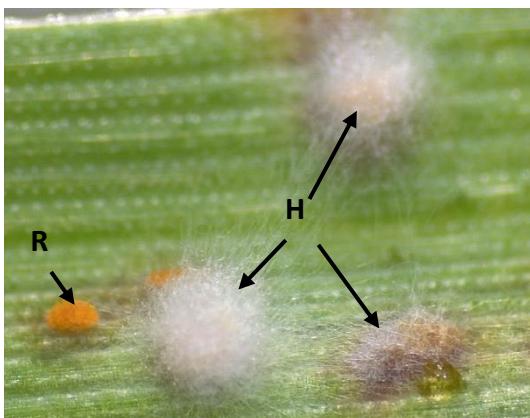
[Dr Michelle Moffitt](#)

Senior Lecturer, Western Sydney University  
Campbelltown, NSW



Rust is a plant parasite and each species of rust has a narrow host range. Of particular concern in Australia is rust disease of cereals including wheat, and *Austropuccinia psidii* (myrtle rust) which infects Australian native plants of the family Myrtaceae. Rust infection of wheat crops can result in more than 20% reduction in grain yield and stripe rust alone costs the wheat industry \$127 million average per year (The Current and Potential Costs from Diseases of Wheat in Australia; grdc.com.au). Myrtle rust was first detected in NSW in 2010 and has subsequently been reported in VIC, QLD, NT and TAS. At least 382 native species belonging to the Myrtaceae are susceptible to the pathogen. Sixteen species currently require urgent conservation action (Myrtle Rust Action Plan; apbsf.org.au). The disease will not only impact ecosystems in Australia and biota that depend on these plants, but also tourism, food, forestry and horticulture industries. Therefore, understanding the myrtle rust pathogen and identifying novel methods for inhibiting its growth will be crucial over the coming years.

Hyperparasites are parasites, whose hosts are parasites themselves, including rusts. Not much is known about how a fungal hyperparasite exerts its effects on its rust parasite host. We have recently reported the isolation of six new strains of hyperparasite isolated from infected rust pustules on wheat and oat, as well as willow and poplar. Each of the six hyperparasites were tested for their effect on rust infection in three plants; wheat, oat and barley. Interestingly, we identified that the hyperparasites work in different ways to decreasing rust pustule formation. These included one or more of the processes of direct parasitism (Fig 1), antagonism by antibiosis, competition, and/or induction of host plant resistance.



**Figure 1.** Microscopic analysis of the interaction between hyperparasite (H) and wheat leaf rust parasite spores (R). Light microscopy of a wheat leaf rust pustule consisting of spores (R) on a wheat leaf. Hyperparasite, *Lecanicillium psalliota* hyphae have grown over the surface of three rust pustules (H).

We have sequenced the genome of most of our hyperparasite strains and have identified that they all contain a significant number of gene clusters encoding for secondary metabolites, many of which are of unknown function. Secondary metabolites include small molecules of diverse structures, such as peptides, polyketides, terpenes that have bioactivity, including antifungal activity. We are currently investigating the role of secondary metabolites in the inhibition of rust fungi and their potential use as fungicides in agriculture.

For more information on hyperparasites for pathogen control: (1) Wilson, A. et al. Investigating hyperparasites as potential biological control agents of rust pathogens on cereal crops. *Australasian Plant Pathol.* **49**, 231–238 (2020). <https://doi.org/10.1007/s13313-020-00695-8>. (2) Harm GFS et al. 2018. Draft genome sequence of the fungus *Lecanicillium psalliota* strain HWLR35, isolated from a wheat leaf infected with leaf rust (caused by *Puccinia triticina*). *Genome Announc* 6:e01442-17.

<https://doi.org/10.1128/genomeA.01442-17>.

## Other News, Events and Interesting Finds

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Identification of fungi, and determining fungal lifestyle based on sequencing data, can be a harrowing experience for those who are just beginning in the field – or even those of us who have been working with fungi for more than a few years. A recent publication bringing together leading researchers globally has compiled the most recent fungal annotations in their paper “FungalTraits: a user-friendly traits database of fungi and fungus-like stramenopiles.” The authors took data from previously assembled annotations (e.g. FUNGuild, Fun<sup>Fun</sup>) as well as re-annotated >10k fungal genera to produce a dataset covering 17 lifestyle related designed to help the research community rapidly give functional assignments to sequences identified within their environmental studies. As covered in their paper, “on the basis of those sequences [they] were able to summarise trait and host information into 92,623 fungal species hypotheses at 1% dissimilarity threshold.” Check it out at <https://doi.org/10.1007/s13225-020-00466-2>

If you are interested in biosecurity and the work that has been invested in understanding the threat of Myrtle Rust to our native flora, such as the work of Michelle Moffitt above, we would encourage you to check out the upcoming national symposium put on by Plant Biosecurity Science Foundation. The symposium will bring key stakeholders together to build a community of interest, share knowledge and build co-ordination and implementation of the National Action Plan. Presenters will share the latest research, response, surveillance and conservation activity, framed against the Action Plan. Workshop sessions and discussion will aim to maximise the effectiveness of the Plan in reducing the risk of new strain entering Australia, reduce the risk of greater spread, understand the impacts on both species and ecologies, and options for conservation of threatened species. The symposium will have the option of both virtual attendance as well as in-person in Ballina, NSW. Registration can be done at <https://consol.eventsair.com/myrtle-rust/reg0/Site/Register>



How did you keep your sanity during COVID? Did you take the opportunity to ignore the roses and, instead, look down and nose around for mushrooms? PhD candidate Emiko Stuart (Western Sydney University) is an avid hunter of all things mushrooms and has shared a couple photo's with us of her finds, from the beautiful coloration of Hygrocybe to the wonderful curls of Woodear fungi. Enjoy!



## Fungal Education Subcommittee

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We will continue to advertise this major initiative of the [Education Subcommittee](#): they have developed a list on the AMS website of tertiary courses related to mycology available in Australia and New Zealand. This is a great resource for anyone interested in studying mycology at a tertiary level. If you have any courses to add or update for 2021, please visit the Education subcommittee [page](#), and while you're there, check out the other mycology teaching tools available.