



FUNGI FORAGERS

No. 8, April 2018

OUR PURPOSE: TO RAISE AWARENESS AND INTEREST IN FUNGI OF THE CAIRNS REGION

This newsletter is not formally published and is not associated with any club or organisation, but is emailed free of charge to anyone who may be interested. Anyone who wishes to contribute to the newsletter with observations, anecdotes, corrections, comments or photographs is welcome to do so. Although this “newsletter” is science-based we try not to make it too “scientific”. We recognise that there are school children, bush-walkers and others just interested in fungi, and we hope this leaflet will become a medium for furthering that interest. The emphasis is on fungal biology rather than identification.

Barry Muir, Editor Jenn Muir

Tropical Fungi Project Update April 2018 **By Frances Guard**

The wet season has come and come again! We were lucky to have the benefit of good rain in late February and then showers to keep fungi fresh in March. The very heavy rain did mean that some people couldn't make it to the Workshops and Public presentation. That was disappointing for them. We hope that the events can be repeated next year, in some format, and include all who missed out this time round.

So what was achieved?

An introduction to the Kingdom of Fungi: 45 participants enjoyed the first evening of presentations in Kuranda on Fungi as mates, recyclers, food for furry mammals, and parasites that control populations of insects by making them zombies!

The Kuranda Workshop, hosted by Kuranda EnviroCare, saw 30 people delving more deeply into fungal morphogroups, how to begin identifying them, how to photograph them for ID, and use of the app iNaturalist for recording sightings of fungi. (Anyone using that app for fungi in the tropics should join the Project: Australian Fungi of the Tropics and Subtropics.) The fungal walks were features of both workshops that rated highest in participants' evaluations. The practical hunt for fungi was most enjoyable!



Polypore workshop at James Cook University



Workshop at TREAT, Lake Eacham

The microscopy and polypore workshop held at James Cook University was a highpoint for some 21 students and 5 tutors. Looking down a microscope for the first time is exciting and seeing the microscopic features of a hard old polypore brings a new world into focus.

Another 30 people joined the TREAT Workshop hosted by the TREAT nursery at Lake Eacham. They could have had double that number but were limited by the number of presenters and leaders for the walks.

So, community engagement has been very positive, and enthusiasm for future events is high. The critical need for field guides for tropical fungi has been demonstrated.

As well, the mycologists undertook several days of fieldwork collecting specimens for the Herbaria. Approximately 260 collections were made from rainforest to savannah woodlands and habitats in between. These collections have been described, dried (with difficulty in the humid atmosphere!), sorted, packaged and sent to Brisbane and Melbourne Herbaria. This is where the hard work really begins. Almost all specimens have had tiny samples taken for DNA sequencing. Several are unfamiliar to us, and so a search of the literature must be done to see if they have been described before. Matching them up with descriptions, names and other DNA sequences is a time consuming process.



Dr Sandra Abell of James Cook University discusses the intricacies of *Xylaria*

Out of it, some will be discovered to be new species and even new genera. This is very exciting for all mycologists. Some will need further collections made to confirm new species. This is where local fungiphiles (photographers and collectors) may contribute significant data for science.

What is next?

Don't forget the Exhibition at the Cairns Botanic Gardens "**Unseen**", with works by artist Donna Davis, and workshops by Donna and Sapphire McMullan-Fisher on the nexus between Art and Science in May-June. For more details, check out Donna's website. (Her work is truly beautiful.)

We are working on producing pocket hand guides for the next Wet Season!

We are already dreaming of another big project in the north next year.

There is just SO MUCH TO DISCOVER!

Frances Guard (Coordinator)



Study of Scarlet Bracket Fungi (*Pycnoporus* species)

Dr Matt Barrett from the King's Park and Botanic Garden in Perth, Western Australia, is trying to sort out the Scarlet Bracket fungi. Until a few years ago they were all put in one species, *Pycnoporus cinnabarinus*, because they were considered the same as the European species by that name. Later it was realised that the Australian species was, in fact, different to the European Cinnabar Bracket and the name was changed to *Pycnoporus coccineus*. It was then recognised that there appeared to be two forms, a thin one in the tropical north which was then named *Pycnoporus sanguineus* and a thicker, paler species in the drier and more temperate regions and which kept the name *Pycnoporus coccineus*.



A magnificent *Pycnoporus sanguineus* growing in the Cairns Botanic Gardens

Now Matt's genetic studies have shown even more complexity! There appears to be one more named species, *Pycnoporus puniceus*, plus at least four undescribed species. One of those is only known from a photograph taken in Litchfield National Park in the Northern Territory. Much of Litchfield National Park is similar to some environments up on Cape York and it is quite likely that this particular species also occurs in Queensland. Matt has provided some information to help you in recognising the different species. The one he seeks in particular is somewhat hoof-shaped with large obvious pores. We have attached a copy of Matt's notes.

This study provides an example of some important principles in studying fungi. Firstly, don't ignore the apparently common things. I know I have walked past dozens (or possibly hundreds) of *Pycnoporus* and ignored them as being common or at least uninteresting. Clearly none of us can afford to just assume that common and so-called "easily recognisable" species are not worth closer examination.

Secondly, and tied to the first principle, is that one wonders how many fungus species, and, if it comes to that, how many plants and animals are also not recognised as new or interesting **just because nobody looked**. As an example, some years ago when Jenn and I were working in Vietnam, a new species of deer was discovered in the forest. It stood about 1.5 tall at the shoulder and was striped. How could anyone miss it after years of studies in the area by numerous biologists? The explanation was that its footprints had been known for years because they were a little different to other forest animals but nobody looked specifically because it was just assumed to be a pig with slightly malformed feet! So next time you see a slightly malformed fungus, take a closer look – it could be a new species.



REMINDER: Membership of QMS for 2018 commenced on 1 January (to 31 December 2018) and we recommend that if you are planning to join Queensland Mycological Society (QMS) or renew your existing membership that you do so now for just \$25 per person. There are many benefits, including access to

members-only parts of the QMS website with masses of information. There is also a free quarterly newsletter, with identifications, field trip reports, etc. Go onto <http://qldfungi.org.au> to learn more.

Calendars

Just because it's April already, don't be put off. The QMS has produced a superb fungus calendar for 2018. These are available from info@qldfungi.org.au for \$15 each for non-members (\$10 for QMS members) plus postage.



Bees collecting fungus spores

Stumbled across an article extracted from by Rachel David in New Scientist magazine (<https://www.newscientist.com/article/dn28381-bees-found-farming-fungus-for-first-time-to-feed-larvae/>) that discusses bees collecting fungus spores. The article refers to a study of Brazilian stingless bee, *Scaptotrigona depilis*, in the lab where scientists originally mistook a white *Monascus* fungus growing in their hives to be contamination.

The researchers found the fungus in all the hives they looked at and began to suspect it was there for a reason, especially since it was growing inside brood cells – the structures that social bees build to house their growing larvae. It was found that the fungus is a key part of the hive, permeating the wax and resin that the bees use as building material. After the bees have deposited regurgitated food for the larvae inside the cells, and laid an egg, the fungus starts growing. Once the egg hatches, the larva feeds on the fungus, and it turns out this food is absolutely crucial. When the team tried to grow the bees in the lab without the fungus, the survival rate of the larvae dropped dramatically – from 72 per cent to just 8 per cent. The survival difference may be either due to some nutrients provided by the fungus, or due to the fungus protecting the regurgitated food from spoiling. When bees leave to start a new colony, they take some of the wax with them

to build the new hive structures, so their fungal farm comes too.



Proof that bees do not just collect pollen. An introduced honey bee (*Apis mellifera*) collecting scale insects and their exudates from the underside of a leaf – Burrum River near Howard, Queensland.

The scientists think there are more farming bees to be found. "Given the substantial diversity of bees, many of which are poorly studied, it is likely that other bees engage in similar associations," one of them said. This raises concern about the use of

fungicides, which while not directly harmful to bees, may be affecting them by killing off their symbiotic fungi.

The original Journal reference was *Current Biology*, DOI: 10.1016/j.cub.2015.09.028

This led me to another article in the journal "Bee World" Volume 71 (No. 4) Pages 158-176 published in 1990 by Dorothy Shaw right here in Queensland at the Department of Primary Industry at Indooroopilly (<https://doi.org/10.1080/0005772X.1990.11099059>). This paper briefly discusses bees collecting fungus spores during the process of collecting pollen or insect honey dew and even deliberate collection of spores, possibly as a substitute for pollen.

Has anybody observed bees collecting spores from any fungus here in TNQ?



Interesting Piccy



These weirdly-shaped fungi have been identified as *Hygrocybe lewellinae*. They were growing in a garden bed in Millaa Millaa on the Atherton Tablelands in a location where they received frequent fumigation from the diesel exhaust of vehicles. Some investigations by us came up with a condition known as “Rosecomb”.

Rosecomb “disease” is a malformation of the fruit body of some gilled fungi and was first reported in 1881 (Kearney & Kearney 2013). Gills may be present on the top of the fruit body, leading to the name rosecomb, although in mild cases it may just be manifest as cap and stipe distortions. In 1930 it was found rosecomb could be induced by such materials as kerosene, creosote and diesel oil and, in 1983, rosecomb was confirmed for a cultivated mushroom to be due to contamination of the substrate with oil, diesel or distillate fumes. Lysol antiseptic has also been implicated (Kearney & Kearney *ibid*).

Rosecomb in *Hygrocybe reesiae* was recorded by Kearney & Kearney (*ibid*) at Lane Cove Bushland Park near Sydney in NSW. To rule out a genetic change as the cause of rosecomb, DNA analyses for both the normal and abnormal specimens of rosecomb-affected *Hygrocybe reesiae* found that the DNA was identical (Kearney & Kearney *ibid*.). This implied that the effect of rosecomb is due not to a genetic change or mutation but to other factor(s) e.g., exposure to petroleum chemicals, was involved. Rosecomb disease of *Agaricus bisporus* (the commercial edible mushroom) is believed to result from genetic instability where exposure to diesel fumes is a promoting factor (Flegg 1983).

Hydrocarbon pollution which could potentially affect fungal growth, resulting in rosecomb if severe, or perhaps more subtle and almost unnoticeable changes. Examples are: gases from nearby sewage farms, run-off rainwater from busy roads (oil, petrol, diesel, bitumen exudates), car exhaust fumes, industrial pollution, and

herbicide and pesticides used in road verge maintenance or at nearby farms, are all contenders for possible causes of structural changes in fruit-body shape.

References

Flegg (1983). Response of the sporophores of the cultivated mushroom (*Agaricus bisporus*) to volatile substances. *Scientia Horticulturae* 21: 301-310.

Kearney, R. & Kearney, E. (2013). Preliminary determination to list the Hygrocybeae community of Lane Cove Bushland Park as a "Critically Endangered Ecological Community". Fungal Conservation issue 3: September 2013. Pp27-31.

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