EDITORIAL

Its a war-zone down there

Just when you think fungi cannot be any more amazing there comes along a report which leaves you astounded at fungal ingenuity. A number of fungi use various physical traps to snare nematode worms in the substrate but in Science Advances 9(3) (2023) Ching-Han Lee *et al*. report on the discovery that Oyster mushrooms, *Pleurotus ostreatus* use an even more remarkable method to subdue and kill nematode worms (*Caenorhabditis elegans* was the nematode used in the study), an important constituent of the oyster mushroom's diet.

While researching the fungus the research team examined tiny outgrowths on the hyphae of the Oyster mushrooms resembling small balloons on stalks (Fig. 1). The slightest disturbance of these cells by any passing nematode caused the cells to rupture instantly, with the result that the nematode became paralysed, whereupon the fungal hyphae were then able to penetrate into the tissues of the nematode and begin the process of breaking down and absorbing its nutrients.

Making this even more sinister is that the fungus also releases several volatile compounds that mimic nematode food and sex cues to lure their nematode prey within reach.

The team was able to prove that the rupturing of the cells was responsible for the paralysis of the nematodes by deliberately shaking the cultured fungal colony after adding microscopic glass beads in order to rupture the cells before adding the nematodes. Without the intact cells being present the worms were able to move about freely.

Further investigation of these tiny balloon-like cells, which they call toxocysts, showed that they contained a potent volatile chemical called 3-octanone which was a major component triggering rapid paralysis and cell death in the nematode prey. They were able to demonstrate that 3-octanone disrupts cell membrane integrity in multiple *C. elegans* tissues, including sensory neurons, muscle cells, and hypodermis, causing massive calcium influx into the mitochondria and leading to cell death. As many nematodes feed on fungal hyphae the use of nerve gas by *Pleurotus* undoubtedly serves a dual purpose of both defence and feeding.

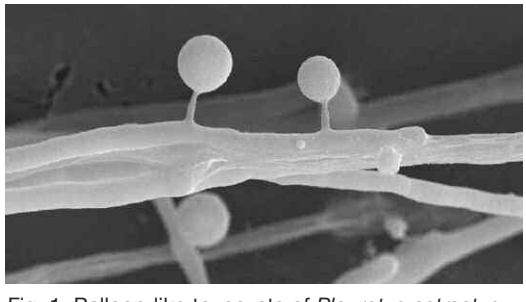

Fig. 1. Balloon-like toxocysts of *Pleurotus ostreatus*. SEM by Yi-Yun Lee, Academia Sinica.

British Checklist Update 11

Martyn Ainsworth at Kew has informed me that the latest update to the *Checklist of the British & Irish Basidiomycota* has now gone online and can be accessed by clicking on the FGBI checklists tab at:
https://fungi.myspecies.info/content/checklists

Here you can see all the latest additions and changes to the British and Irish lists. Thanks to the increasing use of sequencing by local groups the rate at which new species are being recorded in the CBIB area is accelerating rapidly. In 2022 an astonishing 91 species (net) were added of which 78 were supported by DNA analysis. This is a great example of how citizen science can really make a difference to our knowledge of what species are present in this country.

As well as being available as a separate list you can also download compendiums of all the previous lists including this latest update – essential for anyone wanting to know what species are currently accepted as British.

Reference

Lee, Ching-Han *et al*. (2023). A carnivorous mushroom paralyzes and kills nematodes via a volatile ketone. *Science Advances* 9(3). https://www.science.org/doi/10.1126/sciadv.ade4809

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