

Wood Decomposing Fungi

Introduction

- Different parts of a tree are occupied by different species of fungi
- Heartrot fungi like *Laetiporus sulphureus* (chicken of the woods) and *Fistulina hepatica* (beef steak fungus), form 'columns' of decay in the trunks of older trees
- Others roam the forest floor in search of fallen wood; *Megacollybia* (whitelaced shank) is one of a number that form cords (bundles of hyphae) to reach between small twigs connecting lots of food sources. *Hypholoma fasciculare* (sulphur tuft) on the other hand consumes has a similar strategy but often occupies much larger pieces of wood and produces many fruiting bodies; the spores then spread through the air to a new home.



Figure 1: Left. Brown rot in an oak tree at Windsor Great Parks providing a habitat and to wildlife. Right. Fungal cords

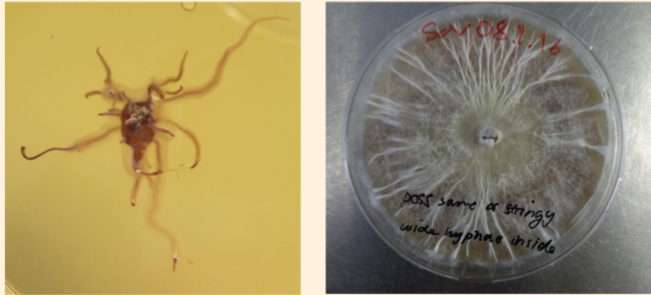


Figure 2: (Left) *Armillaria* forming rhizomorphs on agar. (Right) *Hypholoma* forming cords on a plate

Looking at how fungi behave

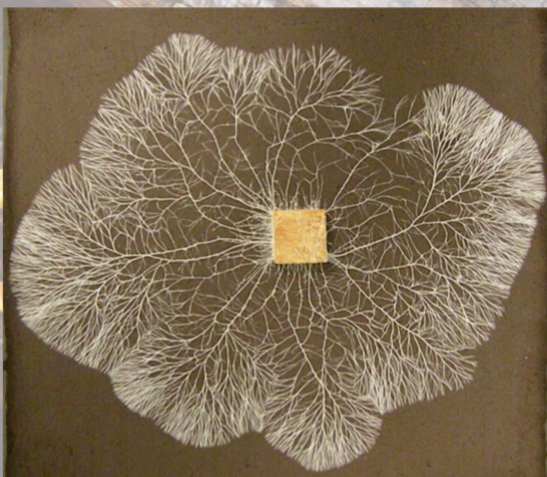
- Unlike plants, which show great differences in appearance (think of how different a tree and a tuft of grass look) the difference between 2 different fungi before they have produced a mushroom fruiting body, can be very similar
- Coring or sectioning: chips of wood are taken out to see what kind of fungi grow from them
- Some fungi can be roughly identified by how they look on a petri dish with the naked eye e.g. *Armillaria* (figure 2) or under a microscope
- Individuals can be distinguished by how they interact on agar
- When there are multiple species present growing from the same chip of wood, they can be separated by 'subculturing' on a petri dish: a small section of mycelium is cut away and placed on a new dish

Why should we be interested in how wood decays?

- Forestry provides fuel and timber for shelter, furniture etc. and not only that, many of us would like to enjoy a walk through the woods too!
- The health of our woodland is therefore very important as poor conditions will affect productivity
- *Armillaria* is seen as a pest when it is killing trees in a plantation, Heartrot can soften wood and lower its economic value
- On the other hand some fungi directly benefit a woodland: *Hericium* (Lion's mane) is an endangered fungus that is very sought after for its seafood-like texture and *Fistulina* infected wood is valued in woodworking and construction for its beautiful staining effect



Figure 3: (Left) Coring an oak tree to investigate the fungi living inside. (Right) Inoculation trials for *Hericium*, could we start reintroducing endangered fungi?



A fungus forming cords on a soil tray

Should we try to influence decay communities?

- Using our understanding of these communities of fungi to benefit our woodland. Rich diversity of fungi could speed up the recycling of nutrients for use by trees, allowing greater productivity
- For example instead of using fungicides/digging ditches to isolate trees to protect from *Armillaria*, studies have looked at inoculating trees with more competitive fungi to 'fight off' root rot (Cox and Scherm, 2006) or the soil to prevent the spread of root rot after felling trees (Boddy, 2000)
- Trees can be intentionally wounded to make habitats for invertebrates which feed on the fungi living in trees

Geoffrey Liddell. With thanks to Lynne Boddy, Matt Wainhouse, Elliot and Brunon Malicki and The British Mycological Society. Produced for the BMS funded summer studentship 2019

References:

- Cox, K. and Scherm, H. (2019). *Interaction dynamics between saprobic lignicolous fungi and Armillaria in controlled environments: Exploring the potential for competitive exclusion of Armillaria on peach.*
- Boddy, L. (2000). *Interspecific combative interactions between wood-decaying basidiomycetes.* FEMS Microbiology Ecology, 31(3), pp.185-194.