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Fungi world: Unexpected evidences show that tree workers are more prone to attract microfungus' spores due to hard labour and consistent dust inhalation.

Written by Tiago Miranda



Source: Google Images

I don't mean to worry any of you about this underworld not much scrutinized. With the help of modern science, we can understand them better. Mycology should be the next subject if we'd like to study more in detail about trees and our environment. Nonetheless, we must be aware of fungi and virus evolvments while we are working outside with our hands-on in cutting wood, breathing dust or treating specimens.

Some funguses are inoffensive until in contact with our internal environment causing death and/or chronic illnesses. Recently I've read tons of articles about a specific species called *Cryptococcus gattii* and *Cryptococcus neoformans*, which the first one derived from *C. neoformans var. gattii*, creating different variations within species depending on its environment adaptations. Both species cause a rare infection called Cryptococcosis that affects the lungs or the central nervous system (CNS), which are the brain and spinal cord. Symptoms like coughing, shortness of breath, chest pain, headache, nausea and vomiting or changes of behaviour are commonly found when infected that could be delayed accordingly to the person's immune system behaviour. In other words, it does affect healthy people thus more likely to cause more damage in immune-deficient ones, such as those with HIV or autoimmune conditions.

Well, from this point onwards you might be asking yourself: "Ok, why should I worry about that then? You sound apprehensive." In reality, I don't seem to be concerned but sceptical about the lack of research and how we can be easily affected during our tree works

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operation. Following a historical contextualization, this mould was first found in Vancouver Island in the '90s. Since then not much attention was given to it until nowadays it is worldwide spread including Australia. *Cryptococcus gattii* is an environmental fungus that emerged in a temperate climate, though recent studies showed that was also found primarily in tropical and sub-tropical regions around the world, such as Australasia (New Zealand, Australia, New Guinea etc). Submerging into recent studies, species such as *Eucalyptus camaldulensis* and *E. tereticornis* are the major environmental sources of *C.gattii* and seasonal flowering was linked with airborne dispersal. It can be even worst: decomposing wood in tree hollows has been identified as an environmental source as well. It is proven that eucalyptus trees are one of > 50 different species that can provide an ecological niche for *C.gattii* and *C.neoformans*.

Above all facts, it was long known as a rare but devastating cause of meningitis in forestry workers and koalas. It is endemic to Australia, where researchers showed its preferred home was eventually the eucalyptus tree. Due to its capacity of adaptation, this type of fungus has possibly evolved strongly during pesticides operations and soil depletion along the years. It is not new that eventually would burst an epidemic. Main question is: what should we do about it as arborists then?

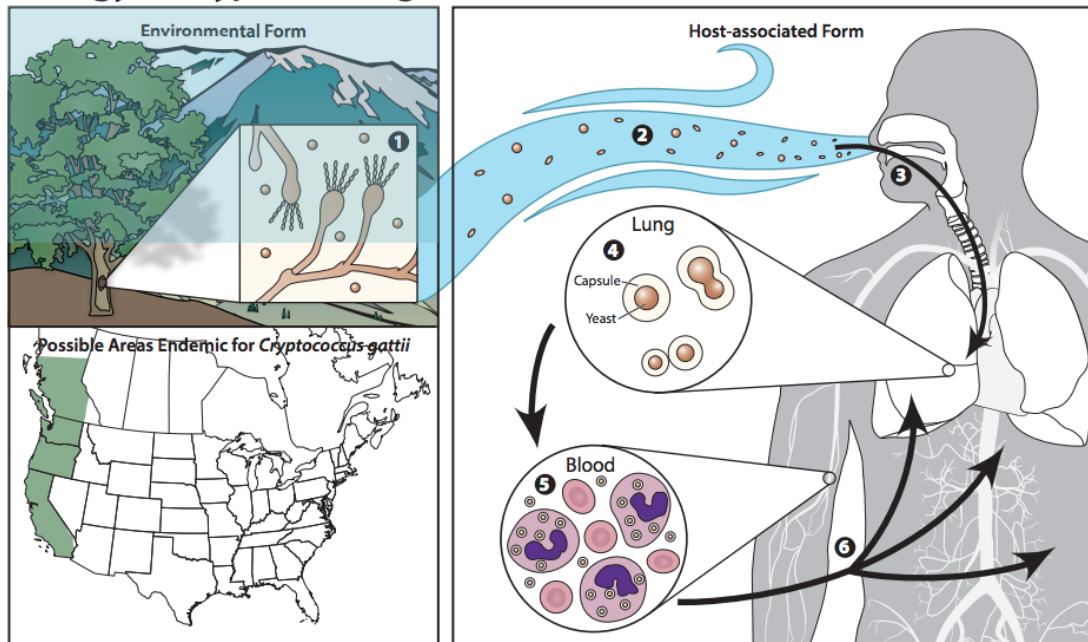
Putting into perspective that fungi spend their lives quietly decomposing the planet's organic waste, freeing nutrients into the environment to be utilised by others and also recognised as an important part of our internal environment (microbiome), with the right mix of fungi in a "mycobiome" playing a role in the gut and skin health, we should primarily look after our health. Healthy tree worker generates healthy environmental contributor. The misconceptions always come down to our food intake – mostly undermined by the junk food industry with a lack of essential nutrients unable to develop a sustainable microbiome. Understanding about our gut, we effortlessly contribute to the environment and provide a strong body foundation to avoid problematic invaders but not denying essential organisms that sustain our body functions. Moreover, our contact with sawdust should be something to avoid inhalation completely, implementing specific masks (as small as 3 micrometres of filter protection) as part of PPE when dealing with removals or in contact with affected parts of a tree. But how can you identify affected parts? Partly from the conception that moulds are propagated by air (airborne) and located mostly in dry organic matter, which it could be mainly bird faeces deposited near

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propagules (a material that functions in propagating an organism), such as flowers or stems. When chainsaws or chippers process those, there is a huge probability of infection during breathing nearby. Improved masks and completely avoidance must be the key.

Apart from a desperate attitude to remediate such a problem, we should embrace this issue as part of our daily work activity and accept that we are completely vulnerable for future outcomes. It must be noted that encouragement is the driven force to discuss more about this subject soon and maybe provide a better understanding for generations to come.

Biology of *Cryptococcus gattii*



Source: Google Images

References cited:

- https://mobile.abc.net.au/news/2019-04-17/fungus-superbug-next-threat-to-human-health/11018652?fbclid=IwAR3l0yGS02Ufv3An_S-VjjhzMzfDo5HfC0Np_r-TrOMS4f_G_oUBLd38zOo&pfmredir=sm
- <https://www.cdc.gov/fungal/diseases/cryptococcosis-gattii/causes.html>
- <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.535.3412&rep=rep1&type=pdf>
- <https://cmr.asm.org/content/cmr/27/4/980.full.pdf>