

The wood-wide web

Fungi could be the hardest-working thing in your garden and the best symbiotic relationship your plants will ever have.

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Why did the mushroom go to the party? Because he was a fun guy (fungi). Dad jokes and pronunciation aside, fungi are not just fun, they are amazing. Have you ever considered the fungal life in your own garden – not the edible mushrooms, but the widespread network in the soil that you want to look after because it does incredible things for your garden's soil and plants?

Recently, two ugly milkcaps popped up in a dark, moist corner of our garden (ideal fungi conditions). They grew to be huge and led me to discover more about what fungi do for our gardens and soils.

MORE THAN YOU THINK

It is estimated that there are between 2–4 million species of fungi. They include mushrooms, moulds, mildews, rusts, smuts and yeasts. Until quite recently, fungi were lumped into the same category as plants, but fungi are different from plants, as they are heterotrophs, meaning they 'eat' by absorbing dissolved molecules. Fungi secrete digestive enzymes onto organic material surrounding them, often wood, to access this food. Plants, on the other hand, are autotrophs, and make their own food via photosynthesis.

It's hard to overestimate fungi's importance – they make up about half of the living mass in soil. Fungi play a vital part in growing delicious, nutritious produce by supplying nutrients that plants require, and then those nutrients are passed on to us.

There are macro and micro fungi, with most fungi species being microscopic. Macro fungi are the bigger ones, found in the form of mushrooms, boletes, pouches, puffballs, bird's nests, stinkhorns, corals and clubs, cup fungi, jelly fungi, bracket fungi, lichens and insect killers.

Only 10 per cent of fungi produce mushrooms, the fruiting body of a fungus. Mushrooms represent one way that some fungi spread by containing reproductive spores, which are ejected and spread by wind. Other fungi spread underground in an interconnected web of mycelium.

Micro fungi are crucial contributors to our food system. You can see this in your own garden – if the same crop has been grown in the same place time after time, the soil diminishes in life and the crop suffers, and that's because the fungi is not getting the diversity it needs.

DIFFERENT MODUS OPERANDI

Fungi grow and eat in different ways:

- **Decomposition:** Saprophytic fungi are the decomposers, breaking down dead stuff and turning it into usable nutrients and rich soils. They grow on dead and dying organic matter, like leaf piles, old wood and distressed trees.





1. Tūtae kēhua translates to ghost droppings – a perfect name for this skeletal-looking stinkhorn fungus. 2. Devil's fingers stinkhorn. We often have stinkhorn beauties pop up in our garden. 3. Mycorrhizal mycelium is the most widespread organism in soil.

Parasitism: These fungi grow from a host, so are potentially harmful pathogens that affect plants, cause disease and damage hosts. One example is myrtle rust (*Austropuccinia psidii*), which is threatening native trees such as mānuka, pōhutukawa, rātā and kānuka at the moment.

Mutualism: These fungi form relationships with plants to secure food. This includes lichen; endophytic fungi, which grow within plant tissue; and mycorrhizal fungi, which have underground networks called mycelium. These thread-like networks interact with plant roots to source food. The plant supplies sugars from photosynthesis, while the fungus provides nutrients from the soil.

You will have seen mycelium when digging in the garden – white wisps branching out in lumps of dirt, beneath old logs and in leaf litter. Mycorrhizal mycelium is the most widespread organism in soil. Just one teaspoon of soil contains about 10km of mycelium and more than 90 per cent of plants have relationships with mycorrhizal fungi.

BUT WAIT, THERE'S MUSH, MUSH MORE

We should welcome fungi into the garden for their superb ability to keep soil moist, break down otherwise stubborn substances and produce disease-fighting compounds. Plants are dependent on their fungi allies for nitrogen, phosphorus and other nutrients from the soil. Some fungi and microbes also secrete antibiotics that protect the plants from disease. This is a symbiotic relationship, where plant roots secrete sugars and vitamins that are helpful for beneficial bacteria and fungi.

To learn more about fungi, there are some fantastic books. I'd particularly recommend *Fungi of Aotearoa* by Liv Sisson. Also, see what you can find in your backyard, starting in the darker corners. As well as ugly milkcaps, we've had the wonderfully named devil's fingers stinkhorn and tūtae kēhua (ghost droppings), which is also known as white basket fungus. These are definitely not edible. In fact, the majority of fungi should not be eaten. Instead, see them as doing wonders for your garden.

FUN GUY FRIENDS

Look after your soil life by looking after your fungi.

- Think about the diversity and rotation of crops in your garden.
- Minimise soil disruption as much as possible.
- Use the chop and drop approach and leave woody cuttings under hedges.
- Instead of clearing away piles of leaves, allow them to decompose.
- Avoid using chemicals such as herbicides and pesticides.
- Use compost and mulches made from woody vegetation in orchards and food forests to support fungi that naturally dominate there.



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