



Australia is a fungal Eden with about 8,000 species of the larger fungi having been scientifically described. Hundreds, possibly thousands of species of fungi exist in the Otways forests, although many are yet to be named. While most people are familiar with the cap-and-stalk style mushroom, fungi exist in all sorts of weird and wonderful forms shaped like corals, goblets, pancakes, brains and other more curious configurations. While we often only think about fungi when we see mushrooms push through the soil, it is the underground network of fungal fibres known as mycelia that underpin forest health and functioning.

Beneath the soil, fungal mycelia form beneficial relationships known as mycorrhizas with the great majority of plants. Over 90% of plants form these relationships with fungi including almost every plant species in the Otway forests. Usually a single plant species has multiple fungal partners. Scientists consider that the exchanges that occur as part of these relationships are some of the most relevant biological processes on the planet.

So how do these relationships work? In these subterranean alliances, fungi either sheath plant roots or directly penetrate the root cortical cells, greatly extending their root systems, and helping them to access water and nutrients. They also improve the resilience and health of plants by increasing their drought tolerance and resistance

to soil-borne disease. Plants return the favour by providing the fungi with a feed of sugars produced through photosynthesis. What's more, these mycorrhizal networks stretch beyond just individual trees. Fungi extend relationships through the soil to other plants, facilitating nutrient transfer between them and uniting plant communities. Mycorrhizal networks are now considered to be the orchestrators of plant interactions mediating their growth and survival.

The fungal network of mycelia is like a giant scaffold, building architecture in soils, allowing water to gently percolate to deeper horizons and aerating the soil so it becomes inhabitable to other forms of life. Fungi are also the great recyclers of organic matter, returning nutrients to the soil and making them available to plants. Through secreting enzymes, they can degrade almost any organic material containing carbon. Although bacteria and invertebrates also contribute to decomposition processes, only fungi can degrade lignin. Every leaf and stick that falls to the forest floor will be recycled by fungi.

Ever noticed signs of animals digging while wandering around in the forest? Fungi also provides food for dozens of native mammals such as wallabies and bush rats. In autumn, underground fungi such as truffles, can constitute most of their diets. Although European truffles are now harvested commercially in the Otways, the forests harbour a huge diversity of native truffles.

As the air cools and the autumn approaches, make sure you take the opportunity to discover the incredible fungal treasures of the local forests.



About the Author

Dr Alison Pouliot is an ecologist and environmental photographer who runs fungal ecology courses in Australia and internationally. She has been holding fungus forays in the Otways for over a decade. Her recent book, *The Allure of Fungi* documents a forgotten corner of the natural world that is both beguiling and fundamental to life. For more information or join a foray visit: www.alisonpouliot.com.