Fungi breaks down organic matter and it's byproducts are returned to the soil where they are absorbed by other organisms.

**What do fungi do?**

Fungi benefit ecosystems via their vast networks of threads (mycelium), and therefore the actions occur mostly out of sight. Fungi take part in critical processes for landscape sustainability such as nutrient recycling, and beneficial partnerships with plants and animals.

**Fungi cycle precious nutrients**

Nutrient cycling is the continuous supply, capture, replenishment and distribution of carbon and minerals. This is fundamental for the ongoing health and vitality of ecosystems. Fungi are significant in nutrient cycling, as they capture, store, release and recycle carbon and other nutrients (e.g. phosphorus, nitrogen, sulfur, copper etc...). Fungal networks capture soil nutrients, help prevent leaching, and retain nutrients in a plant available form.

**Fungi decompose litter and debris**

Fungi decompose dead organic matter, attack Showing Gymnopilus decomposing some wood living plants, produce wood rots making nutrients available to plants, and return organic matter to soil. A key role for fungi is their capacity to decompose major plant components - particularly lignin and cellulose (the major components of plant cell walls). Fungi are dominant decomposers and nutrient recyclers of forest litter and debris. Without decomposer fungi we would soon be buried in debris.

**Fungi partner plants**

Fungi have symbiotic (mutually beneficial) partnerships with many plants. Some fungal networks act like an extra root system taking up, transforming and transporting nutrients from soil and delivering them to plant roots. The so-called mycorrhiza “fungus-root” systems are often superior to roots alone. The fungi can capture nutrients in the soil far distant from roots. The fungi benefit as the plants supply sugars to them. Many of the world’s plants are partnered by mycorrhizal fungi in natural ecosystems. In Australia hundreds of different native mycorrhizal fungi partner native trees, shrubs and herbs such as eucalypts, sheoaks, wattles, and poison peas. (also see the CSIRO Mycorrhiza website for more detail)

**Fungi feed animals**

In Australia truffle fungi (those with underground fruit bodies) are more diverse than anywhere else. Small native marsupials such as Woylies, Bettongs and Bandicoots are lured by aromas to dig up and eat spore-bearing truffle fruit bodies. The truffle spores pass unharmed through the gut, and are deposited in dung potentially far from the original site of consumption. The fungus benefits by dispersal of its spores. The animal benefits from the nutritional value of the fruit body. To re-establish animals like woylies in the Australian wheatbelt in the future, we need to re-establish their fungal food with the revegetation. Fungi are also eaten by myriads of small soil animals. These animals are important to soil organic matter and to the food web which feeds larger animals and birds. **Fungi do many other useful things**  1. Binding of soil particles by their mycelium which contributes to soil structure and erosion control.

2. Lichens (fungi-algae or fungi-cyanobacteria associations) contributing to nitrogen fixation and to the soil crust flora.

3. Buffering of plants against environmental stresses, e.g. helping to protect plants against diseases.