

6.2 Other Decomposers Reading: Bracket Fungi



Bracket fungi on a living tree.
Photo Credit: George Chernilevsky



Network of thread-like fungal hyphae on dead leaves.
Photo Credit: Jerzy Opiola

Where and How Bracket Fungi Live?

Bracket fungi grow on living or dead trees and are often referred to as “shelf” fungi, because they look like a shelf sticking out from the tree. They are like other fungi in that the “shelves” you see are just a small part of the living fungus body. The shelves are the fruiting bodies that distribute spores that can grow into new fungi. The larger, living part of the fungus, the mycelium, is hidden inside the wood of the tree. Unlike plants, fungi are not made up of a complex systems of roots, stems, and leaves. Instead fungi are made up tiny, thread-like, tubular structures called hyphae that help the fungi attach to trees and absorb nutrients similar to how straws work. These hyphae form a network of absorbing “straws” called mycelium. Fungi also are made of chitin (a material that is also found in the exoskeletons of crabs, lobsters, and insects) that gives the fungus its structural strength.

Bracket fungi are important for recycling nutrients in forest ecosystems. Organic matter with small organic molecules, such as sugars, can be absorbed fairly readily by these fungi, but larger, more complex molecules require the fungi to make enzymes (proteins that break large organic molecules into small organic molecules) so that they are easier for the cells in the hyphae to absorb. They can make enzymes (similar to those made by an animal’s stomach) to break down and digest organic matter such as wood, leaves, and dead animals.

Fungi are one of the only organisms that can break down the structural molecules in wood (cellulose and lignin) into readily absorbable sugar molecules. Fungi also release nitrogen, phosphorous, and other minerals when they break down and use organic matter. Plants absorb these minerals from the soil and use them to make large organic molecules.

How Do Bracket Fungi Live and Grow?

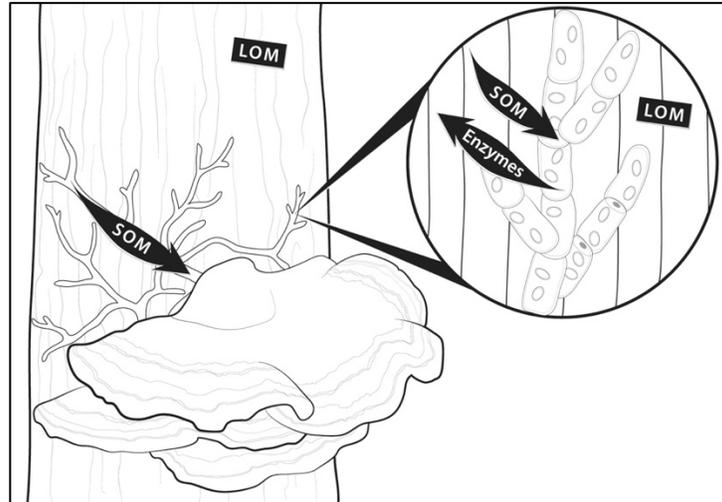
Unlike plants which get their energy directly from the sun using photosynthesis, bracket fungi get theirs by digesting living or dead organic matter similar to animals. Fungi have no mouths or stomachs but instead absorb sugars directly through their mycelium as they grow through or over their food. All the cells in the fungi use that sugar to live and grow. We can explain how bracket fungi does this in four steps.

Step 1: Cells in the fungi absorb sugars in their environment through their thread-like hyphae via the chemical process of digestion.

Unlike most animals which ingest food and then digest it internally, bracket fungi first digests food and then ingests it. Bracket fungi produce enzymes (proteins that help break down complex molecules) in their hyphae and transport them into their environment. Then, the smaller, sugar molecules that are produced by this external digestion are absorbed through the large surface area of the mycelium.

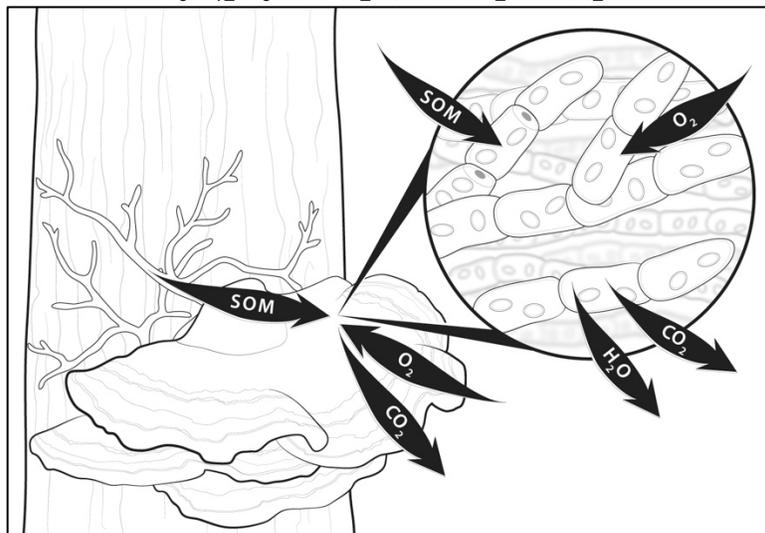
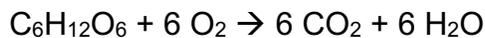
Step 2: Small organic molecules move to all the cells in the fungus.

Tiny holes between cells allow for the rapid flow of small organic molecules from cell to cell along hyphae and throughout the whole fungi by the mycelium.



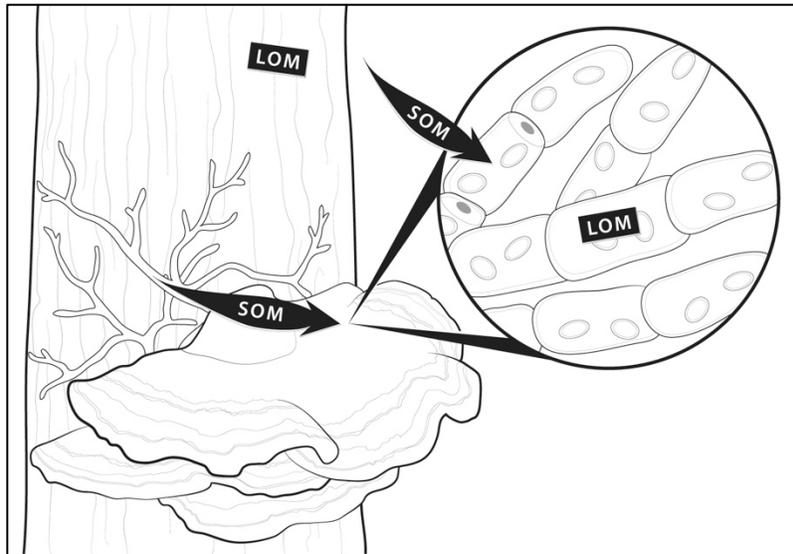
Step 3: All the cells get energy by combining small organic molecules with oxygen in the process of cellular respiration.

All the cells need energy to carry out their life functions, and they get that energy by combining the glucose and other small organic molecules with oxygen. You are familiar with the chemical equation for cellular respiration:



Step 4: Cells grow by making large organic molecules from small organic molecules in the process of biosynthesis.

Bracket fungi grow when their hyphal cells grow and divide. They grow by using glucose that they absorb from materials in their environment.



Digging Deeper: Where You Can Learn More about Bracket Fungi?

- To read more about fungi's role in decomposition:
 - <https://treesforlife.org.uk/forest/forest-ecology/decomposition-and-decay/>
 - http://www.mykoweb.com/articles/Let_It_Rot.html
 - <https://www.sciencenewsforstudents.org/article/recycling-dead>
- To find out more about a specific type of bracket fungi named Turkey Tail:
 - <https://stlawrencelowlands.wordpress.com/2014/11/26/turkey-tail-fungi-natures-recycling-enthusiasts/>