



Welcome to Ground Work

Residues, Enzymes, and Soil Fungi

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Wise Residue Management. For years we've told you how important it is. Now we'll take a closer look at just how corn stover, bean stubble, or other crop residue is broken down and recycled back into the soil.

Crop residues are a complex of cellulose, hemicelluloses, pectins, lignin, and proteins. These crop residues are not easy for all soil microbes to digest.

Soil fungi are the most effective decomposers of agricultural residues. The fungi are able to utilize a wide range of carbon sources which help them survive in an environment where resources are sometimes limited.

Fungi start as spores and grow into threadlike structures called hyphae. Clusters of microscopic hyphae grow together and form mycelia which are visible to the human eye. If you've ever noticed branched white strands of fungi in soil or mulch, those are fungal mycelia. Fungi have an advantage over bacteria in that they are able to span significant distances (2-10 feet) and they are able to absorb and transport important nutrients from one location to another.

Fungi produce a broad range of enzymes that are capable of degrading tough materials like the cellulose and lignin found in crop residues. Fungi will degrade easier-to-digest sugars when available, but most end up degrading tougher, more complex food sources.

The enzymes produced by fungi are secreted from their growing tips.

Trichoderma and *Aspergillus* are especially good at breaking down residues high in cellulose, which is the most abundant plant residue on earth. Fungal decay breaks organic materials into compounds fungi can then absorb through their cell walls. Nutrients taken in by fungi are often immobilized and later released back into the soil.

When it comes to decomposition of crop residues, soil fungi are the key players, but they are not the only players. In any healthy and balanced soil, there is a diverse community of microorganisms present. By producing enzymes that help degrade tough residues, ***fungi start the decomposition process, but it's only with the help of many other soil microbes that the carbon and nutrients from crop residues are returned back to the soil.***